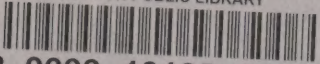


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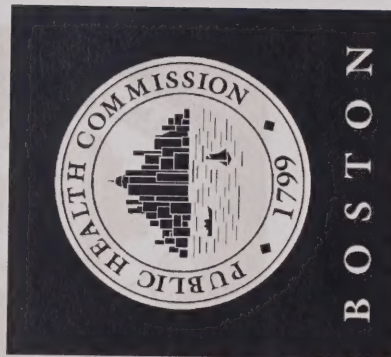








# BOSTON NATALITY 2005



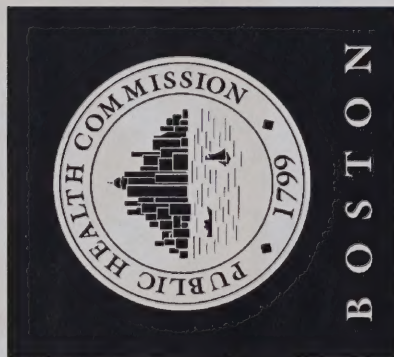
## A REVIEW OF 2003 BIRTH DATA

Prepared by the Boston Public Health Commission

David Mulligan, Chair

John Auerbach, Executive Director

# BOSTON NATALITY 2005



## A REVIEW OF 2003 BIRTH DATA

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### Suggested Citation

*Boston Natality 2005:  
A Review of 2003 Birth Data*  
Boston Public Health Commission  
Research Office  
Boston, Massachusetts  
2005

## ACKNOWLEDGMENTS

This report was prepared by Phyllis D. Sims, MS, Veronica Banks, MPH, Dan Dooley, BA, and Leslie Chen, BS, of the Boston Public Health Commission Research Office, under the direction of Mary Ostrem, Dr PH.

Special thanks to Charlene Zion and staff at the Massachusetts Registry of Vital Records and Statistics, and Alice Mroszczyk of the Bureau of Health Statistics, Research and Evaluation, Massachusetts Department of Public Health for the preparation and provision of the birth and infant death data files of Boston resident births.



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Boston Natality 2005:  
A Review of 2003 Birth Data

## HIGHLIGHTS

- The number of births to Boston residents in 2003 was 7,817, a 2.4% decrease compared with the number (8,005) in 2002.
- Close to one-third (28.9%) of Boston births in 2003 were to Black women; 37.2% were to White women; 22.3% were to Latinas; 7.9% were to Asian women; and 3.8% were to women of another race/ethnicity.
- In 2003, 46.2% of Boston resident births were to women who were born in a country other than the United States, and almost one-fourth of births (20.2%) were to women whose primary language was other than English. The most common of these languages was Spanish, reported on 11.7% of birth certificates.
- Most Boston births in 2003 (72.3%) were to women between the ages of 20 and 34; 2.5% were to adolescents 15-17 years old, 4.8% were to women 18-19 years old, 16.5% were to women 35-39 years old and 3.7% were to women 40 years of age or older.
- Close to half (49.6%) of all Boston births in 2003 were to women having their first child; 29.6% were to women having their second child, and 12.6% were to women having their third. Fewer than one in ten (8.2%) births were to women having their fourth or later child.
- Only 4.0% of births were to women who reported smoking during pregnancy, a decline of 65.8% between 1993 and 2003.
- Eighty-five percent of Boston births were to women who received adequate prenatal care as defined by Kotelchuck's Adequacy of Prenatal Care Utilization Index. A significantly higher percentage (91.1%) of White women obtained adequate prenatal care, compared with Black women (78.4%), Latinas (83.7%), and Asian women (84.9%).
- Boston has experienced a statistically significant increase, from 2.4% in 1993 to 3.7% in 2003, in the percentage of its resident births that are composed of twin, triplet, or higher-order multiples.
- The low birthweight (LBW) rate for Boston decreased from 9.5% in 2002 to 9.0% in 2003. The one-year change was not statistically significant.
- The low birthweight rate among Black births was 13.7% in 2003, significantly higher than the low birthweight rates among Asian births (8.1%), Latino births (7.4%), and White births (6.6%).
- Charlestown (5.2%), West Roxbury (6.2%), Jamaica Plain (6.4%) and Back Bay/Beacon Hill/the West End (6.5%) had lower LBW rates than other Boston neighborhoods and the city as a whole. Mattapan (12.9%), Roxbury (12.5%), Hyde Park (11.8%), and South Dorchester (10.5%) had higher LBW rates.



# BOSTON NATALITY 2005

## HIGHLIGHTS

- Boston women born in the United States had a significantly higher rate of LBW birth (9.7%) than did Boston women born in other countries (8.1%).
- Approximately nine percent (9.4%) of births to Boston residents in 2003 were preterm births (PTB); that is, born before 37 weeks' gestation. Preterm birth has not increased since 1994, the most recent low point, but the difference is not statistically significant.
- In 2003, preterm birth was least common among births to women ages 15-17 and most common among births to women ages 40 and over. The level of PTB for Black births (13.2%) was significantly higher than those for Asian births (6.7%), Latino births (9.9%), and White births (8.2%).
- Forty-nine Boston infants died in 2003, resulting in an infant mortality rate (IMR) of 6.3 deaths per 1,000 live births. The IMR was 7.0 in 2002, but the one-year change was not statistically significant.
- In 2003, Black Boston infants under the age of 1 were 4.6 times as likely as White infants to die, with an IMR of 14.2 deaths per 1,000 live births, compared with an IMR of 3.1 for White infants and 4.0 for Latino infants. This disparity is related to the more frequent occurrence of extreme prematurity among Black births.

## **Introduction**

This report presents data about births and infant deaths among Boston residents in 2003. The data summarizes the number and characteristics of births, birth rates, maternal lifestyle characteristics, medical utilization patterns by pregnant women, and infant health outcomes. Analyses are presented by such characteristics as maternal age, race, Hispanic ethnicity, maternal birthplace, neighborhood, insurance status, and educational attainment. This report highlights health disparities by race/ethnicity and is intended to provide information relevant to the development of interventions intended to eliminate such disparities.

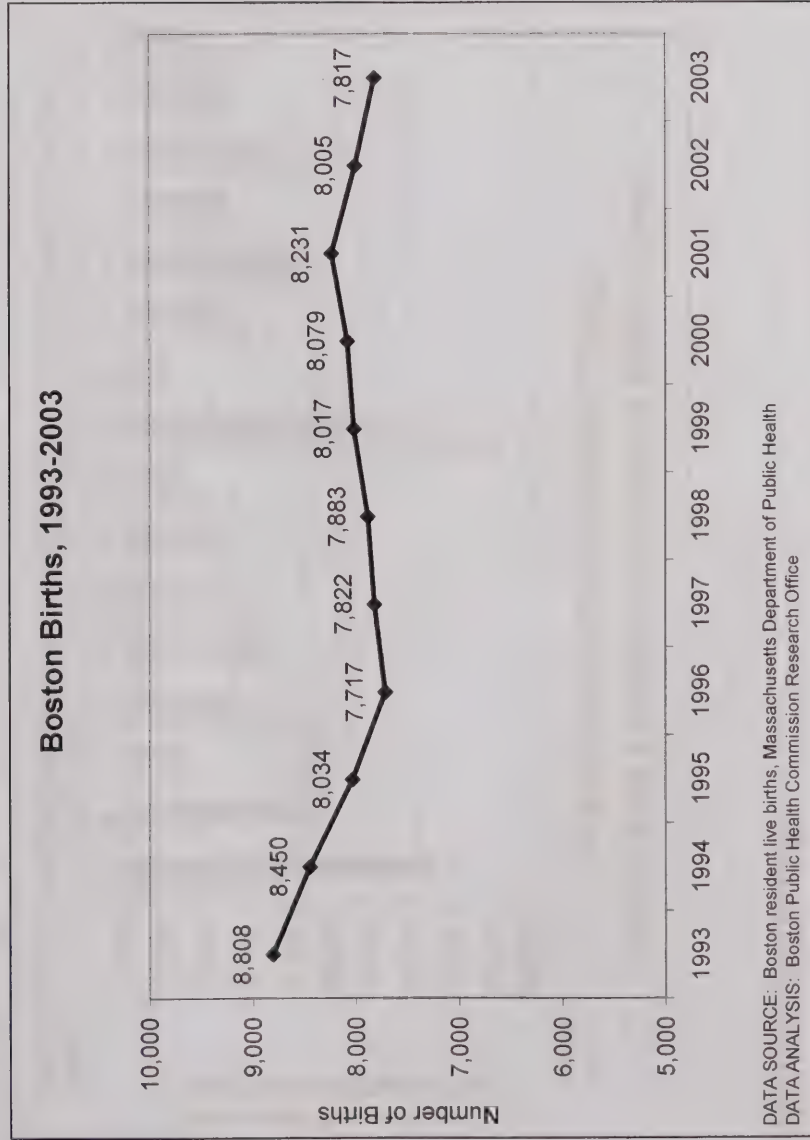
Current information on birth rates is useful to understanding population growth and change. Data on maternal characteristics such as smoking are useful for understanding birth outcomes. Information on use of prenatal care and obstetric procedures can help explain birth outcomes. Monitoring outcomes of birth, especially levels of low birthweight and preterm birth, is important because these variables are predictors of infant morbidity and mortality.



# BOSTON NATALITY 2005

## BIRTHS

### Trend

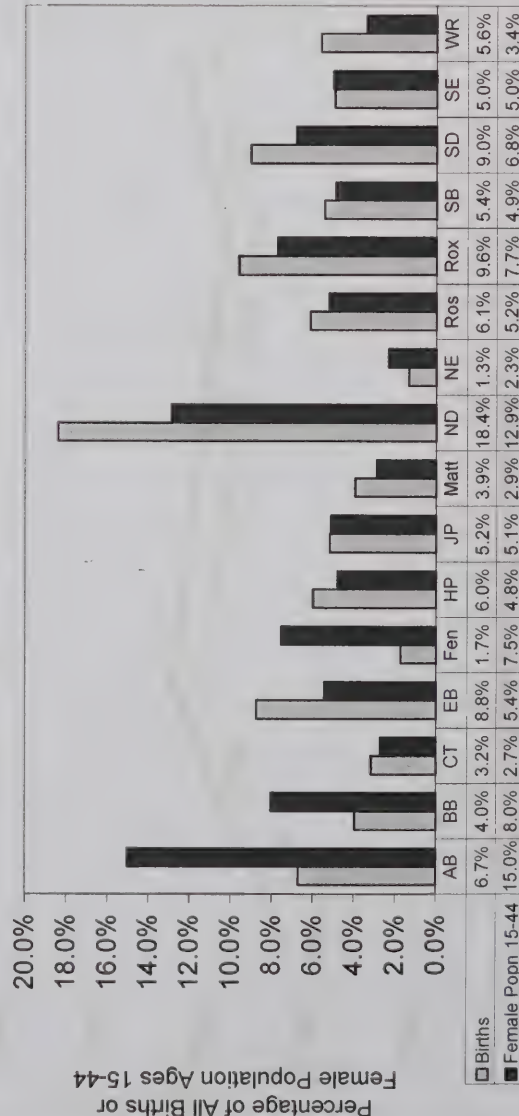


- Boston had 7,817 resident live births in 2003, down 2.4% from 2002 and 11.3% from 1993.
- In 2003, 4,029 (51.5%) male babies and 3,788 (48.5%) female babies were born (data not shown).

## BIRTHS

### Neighborhood

**Births and Female Population Ages 15-44  
by Neighborhood, Boston, 2003**



DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission Research Office

- North Dorchester, with 12.9% of Boston's female population of childbearing age, had 18.4% (n=1,436) of the city's births in 2003.
- Charlestown, East Boston, Hyde Park, Jamaica Plain, Mattapan, Roslindale, Roxbury, South Boston, South Dorchester, and West Roxbury also had larger percentages of Boston's births than they have of the city's childbearing population.
- Allston/Brighton, the Back Bay and Beacon Hill and the West End, the Fenway, the North End, and the South End have larger percentages of Boston's childbearing population than they had of the city's births in 2003.

#### KEY

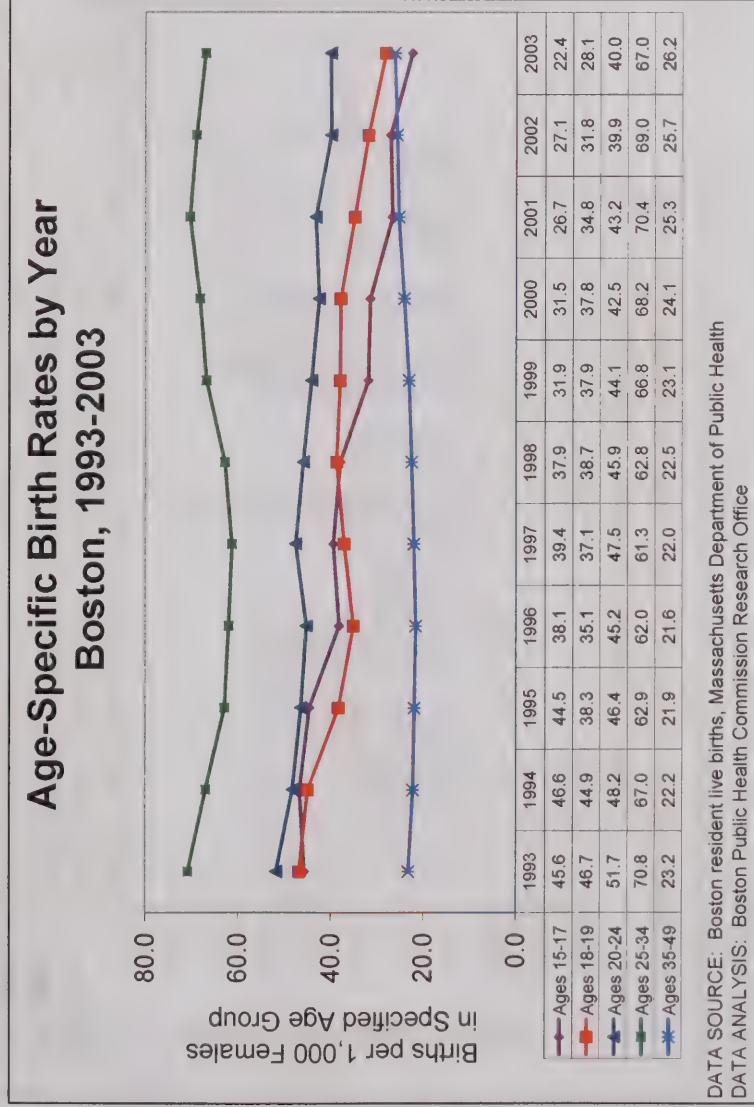
AB = Allston/Brighton  
BB = The Back Bay  
CT = Charlestown  
EB = East Boston  
Fen = The Fenway  
HP = Hyde Park  
JP = Jamaica Plain  
Matt = Mattapan

ND = North Dorchester  
NE = The North End  
Ros = Roslindale  
Rox = Roxbury  
SB = South Boston  
SD = South Dorchester  
SE = The South End  
WR = West Roxbury



## BIRTHS

### Birth Rates

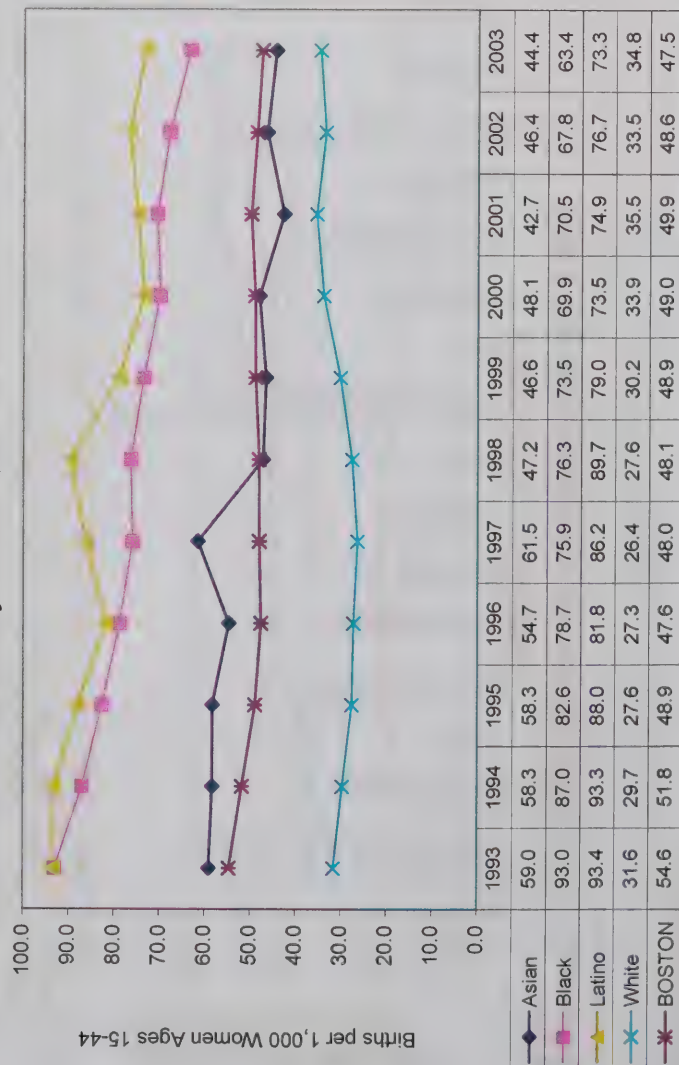


- In 2003, women ages 25-34 had the city's highest birth rate.
- From 1993 to 2003, the birth rate fell 50.9% for adolescents ages 15-17 years old, 39.9% for women ages 18-19 years, 22.6% for women ages 20-24 years, and 5.4% for women ages 25-34 years. All these decreases were statistically significant.
- From 1993 to 2003, the birth rate for women 35-49 years old increased 12.9%, and this increase was statistically significant ( $p < .05$ ).

## BIRTHS

### Birth Rates

Birth Rates Among Women Ages 15-44 by Year and Race/Ethnicity, Boston, 1993-2003



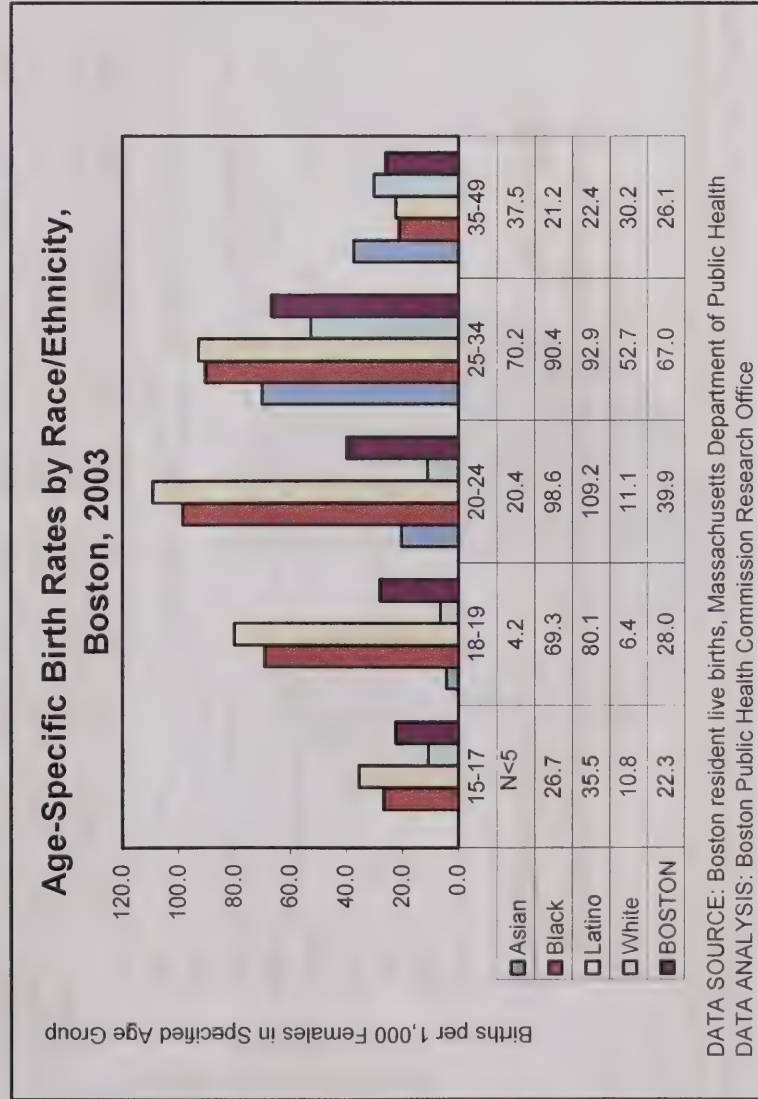
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission Research Office

- The birth rates for Boston overall and for all racial/ethnic groups except Whites have fallen considerably over the past decade.
- The birth rate for Boston overall fell 13.1% between 1993 and 2003. This decline was statistically significant.
- The birth rates for Asians, Blacks, and Latinas fell 24.7%, 31.9%, and 21.5% respectively during the same time period. These declines were statistically significant.
- Latinos and Blacks continue to have the highest birth rates compared with other racial/ethnic groups. The birth rates for Blacks and Latinas in 2003 were significantly higher than the birth rate for their White counterparts.



## BIRTHS

### Birth Rates



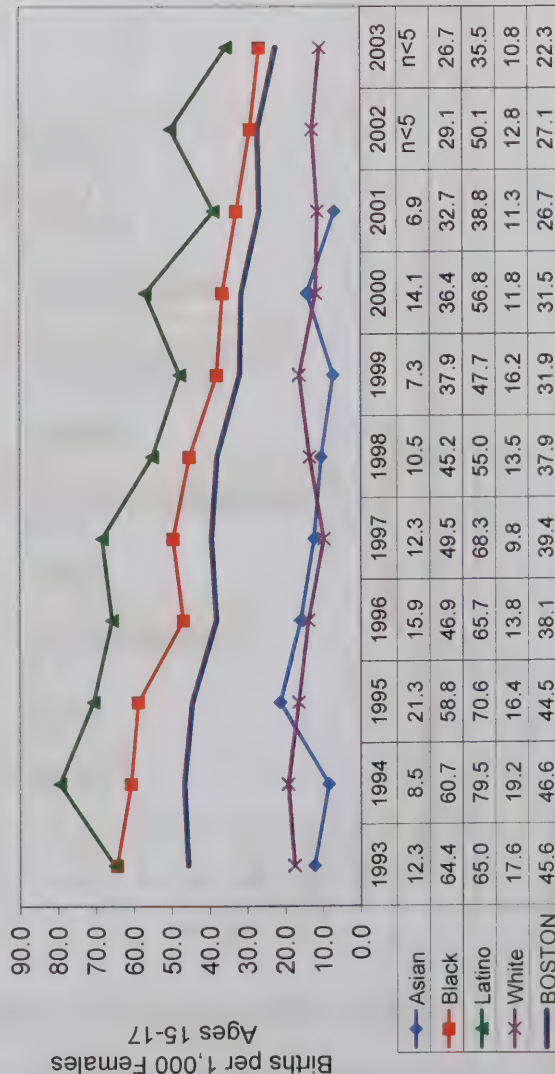
- Birth rate differences by race/ethnicity depend, in part, upon maternal age. In 2003, birth rates for Blacks and Latinas were greater than ten times the birth rate for Whites in the 18-19 year old age group.
- Births rates among women 35-49 varied the least by race/ethnicity.

## BIRTHS

### Birth Rates

*Boston Natality* no longer includes births to 18 and 19 year-olds in the adolescent category. Beginning with the 2003 edition, data pertaining to their births are presented with those of adult Boston women, because childbearing by older teens is often more similar in nature to that of older adults than it is to that of younger adolescents.

**Birth Rates Among Adolescents Ages 15-17  
by Race/Ethnicity and Year, Boston, 1993-2003**



DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission Research Office

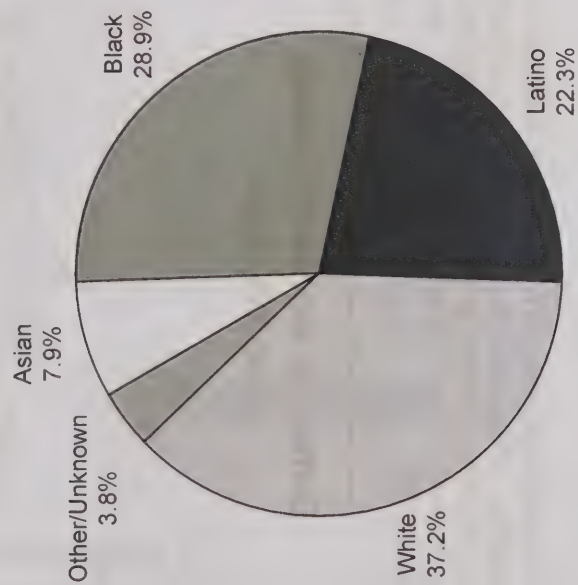
- Boston's birth rate in 2003 for 15-17 year-olds was 22.3 per 1,000 females ages 15-17, similar to the national rate of 22.0 for this age group.
- Boston's rate of childbearing by 15-17 year-olds steeply declined over the past decade, falling 51.1% from the 1993 rate of 45.6. This decline was statistically significant.
- Birth rates for 15-17 year-olds continue to be substantially higher for Latinas and Blacks than for Whites and Asians, but all groups have had declines in recent years. The birth rates in 2003 for 15-17 year old Blacks and Latinas were significantly higher than the rate for their White counterparts.



## MATERNAL CHARACTERISTICS

### Race/Ethnicity

**Births by Race/Ethnicity, Boston, 2003**



DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission Research Office

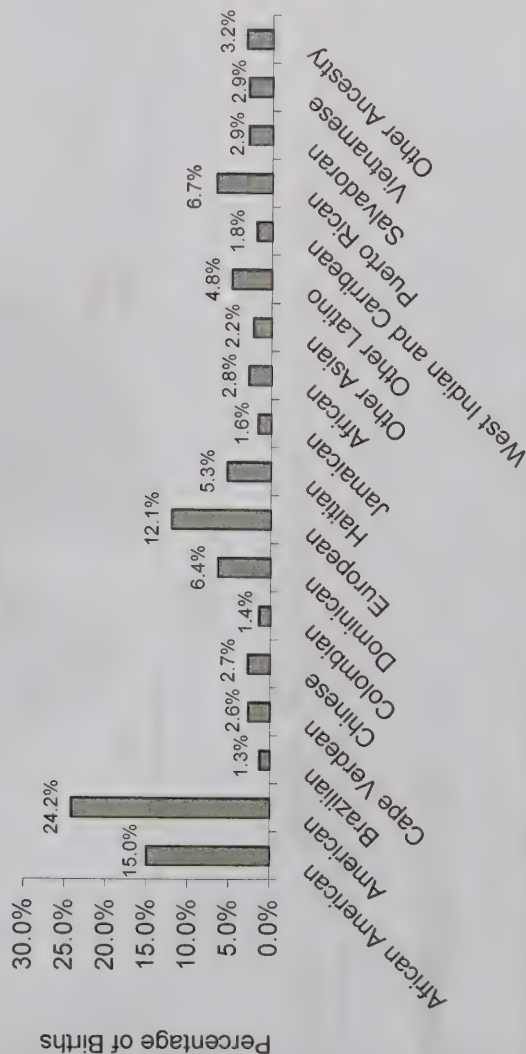
- Boston's population of childbearing women is diverse, and the majority of the city's births in 2003 (59.1%) were to women of color.
- In 2003, there were 615 Boston births to women identifying themselves as Asian, 2,256 to women identifying themselves as Black, 1,742 to Latinas, 2,907 to women identifying themselves as White, and 297 to women identifying themselves as belonging to some other race or for whom information on race/ethnicity was unknown.

## MATERNAL CHARACTERISTICS

### Ancestry

In addition to mother's self-reported race, the Massachusetts birth certificate records mother's self-reported ancestry. This section of the report presents information about the regions and countries from which Boston mothers and their ancestors emigrated. The table below provides information about the most common ancestries for births to Boston mothers of all race/ethnicity groups. Subsequent tables provide information on Boston mothers' ancestries by race/ethnicity.

**Births by Ancestry Group  
Boston, 2003**



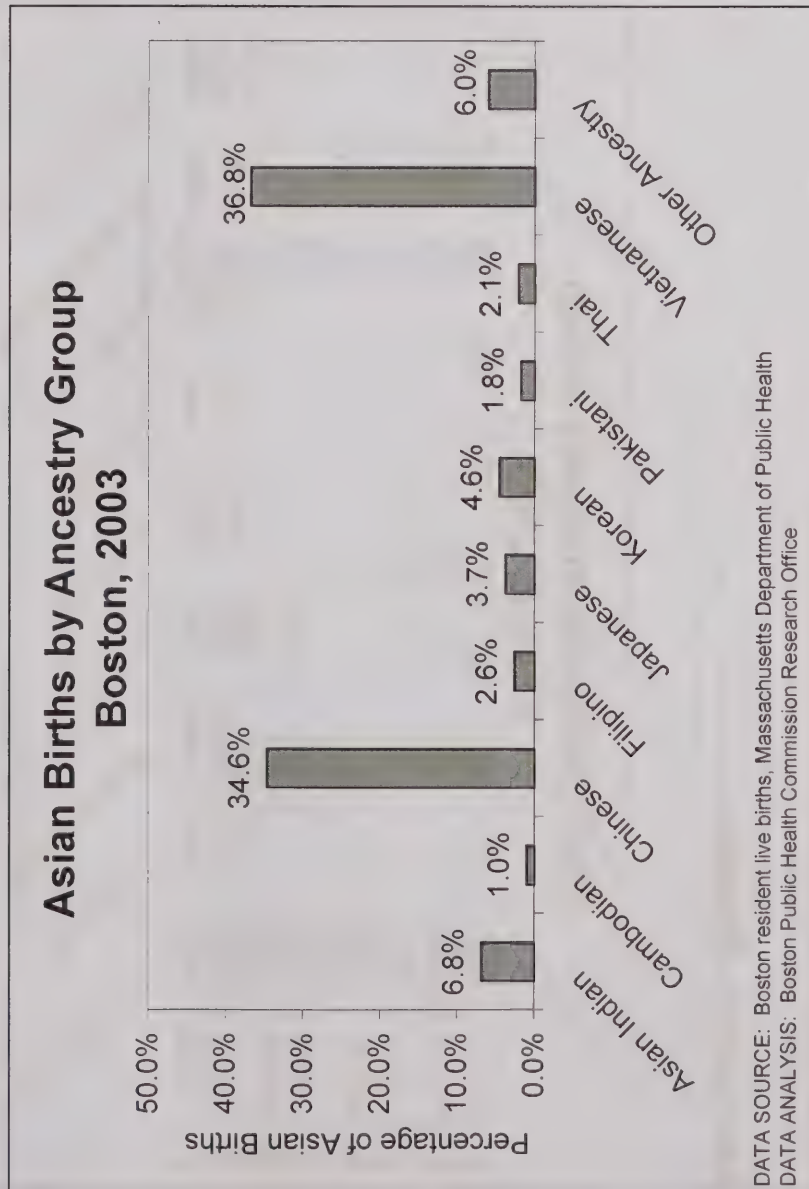
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission Research Office

- Among all Boston resident births in 2003, regardless of race/ethnicity, the most frequently reported maternal ancestry was "American" (n=1,892) (24.2%), followed by African-American (n=1,174) (15.0%).
- In addition to the 17 largest ancestry groups shown in the chart at left, 247 births (3.2% of the total) were to women who indicated belonging to other ancestry groups. Each of these other groups represented fewer than 100 Boston births in 2003.



## MATERNAL CHARACTERISTICS

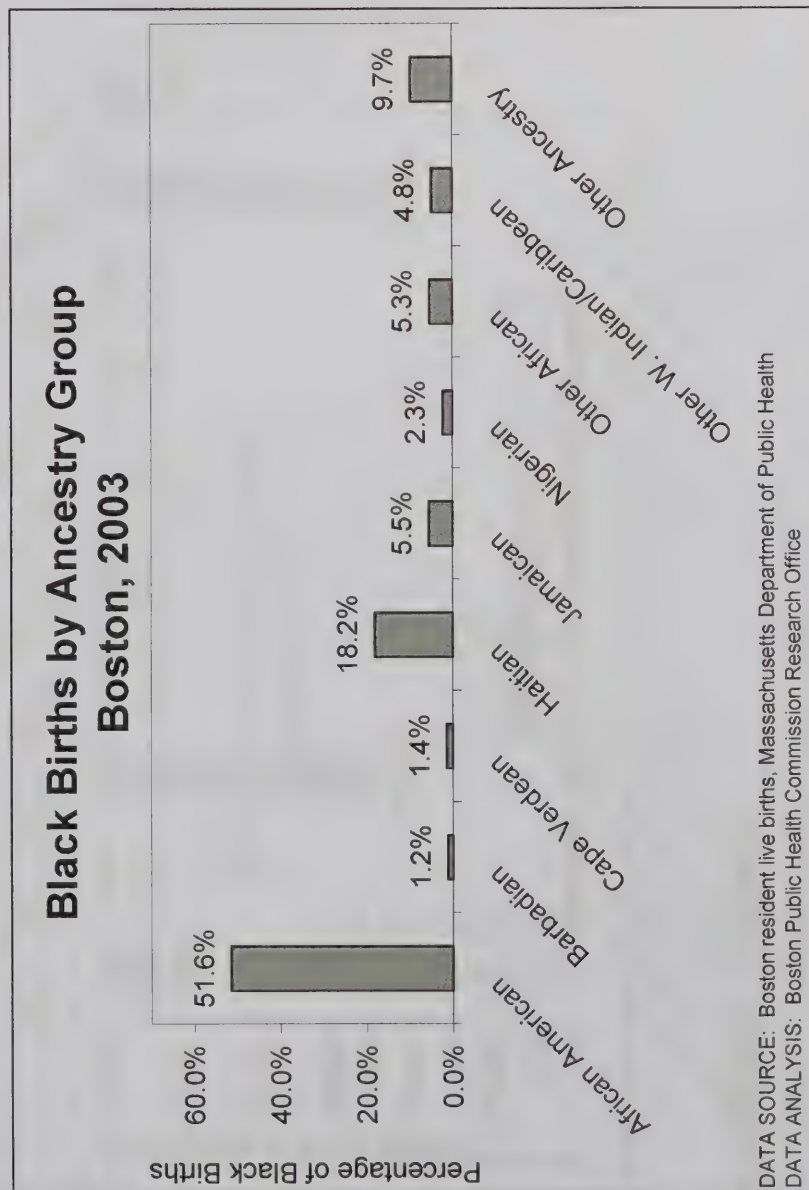
### Ancestry: Asians



- Of the 615 Asian births in 2003 for whom information on ancestry was reported, 226 (36.8%) were to women of Vietnamese ancestry, and 216 (34.6%) were to women of Chinese ancestry.

## MATERNAL CHARACTERISTICS

### Ancestry: Blacks



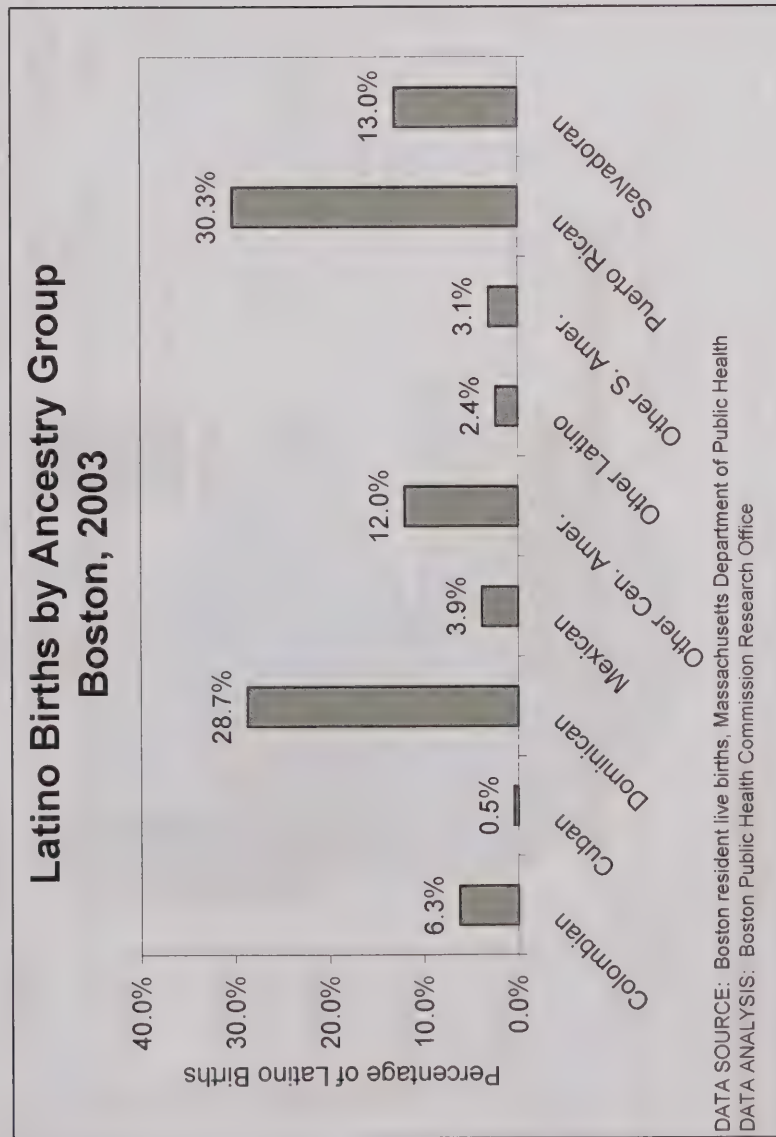
- In 2003, among the 2,256 Black births for whom information on ancestry was reported, 1,163 (51.6%) were to women who identified themselves as African-American in origin.

- The next largest group, Haitians, had 410 (18.2%) of Boston's births to Black residents.



# MATERNAL CHARACTERISTICS

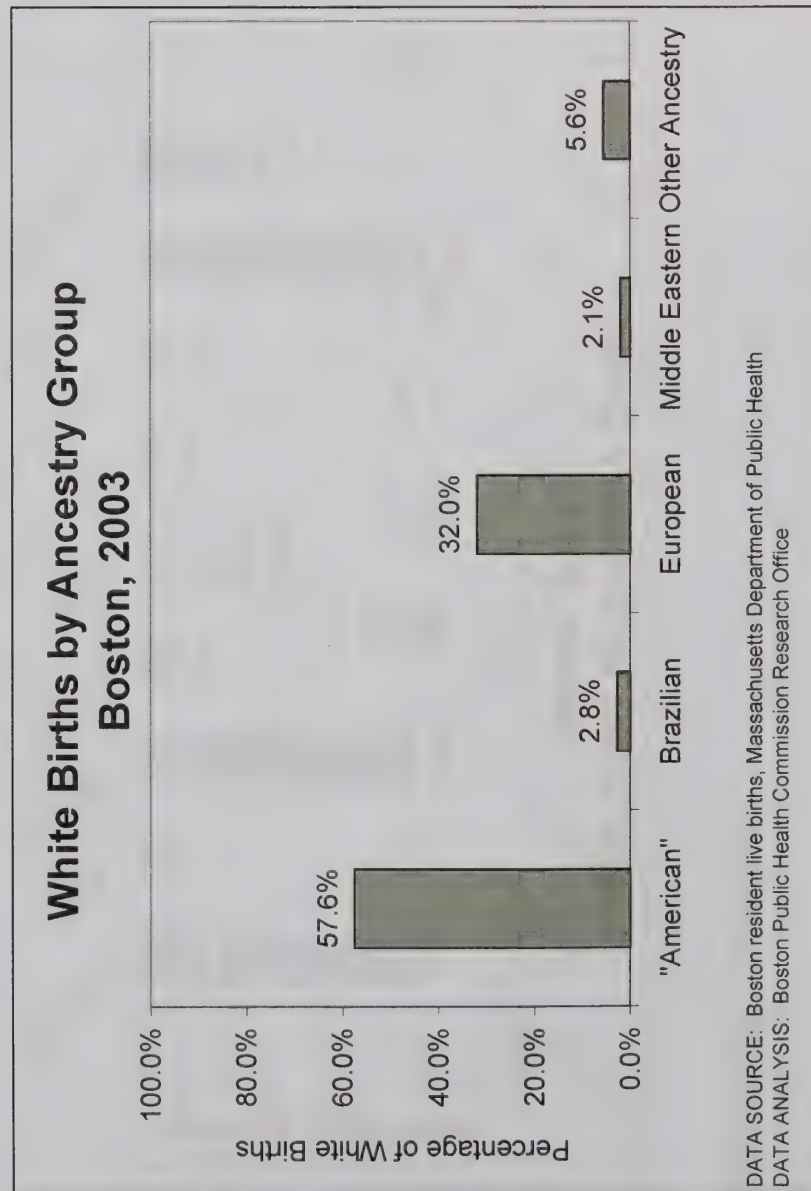
## Ancestry: Latinas



- In 2003, there were 1,742 Boston births to Latinas. Of these births, about one-third (n=527) (30.3%) were to women of Puerto Rican ancestry, about one-quarter (n=500) (28.7%) were to women of Dominican ancestry and 227 (13.0%) were to women of Salvadoran ancestry.

# MATERNAL CHARACTERISTICS

## Ancestry: Whites



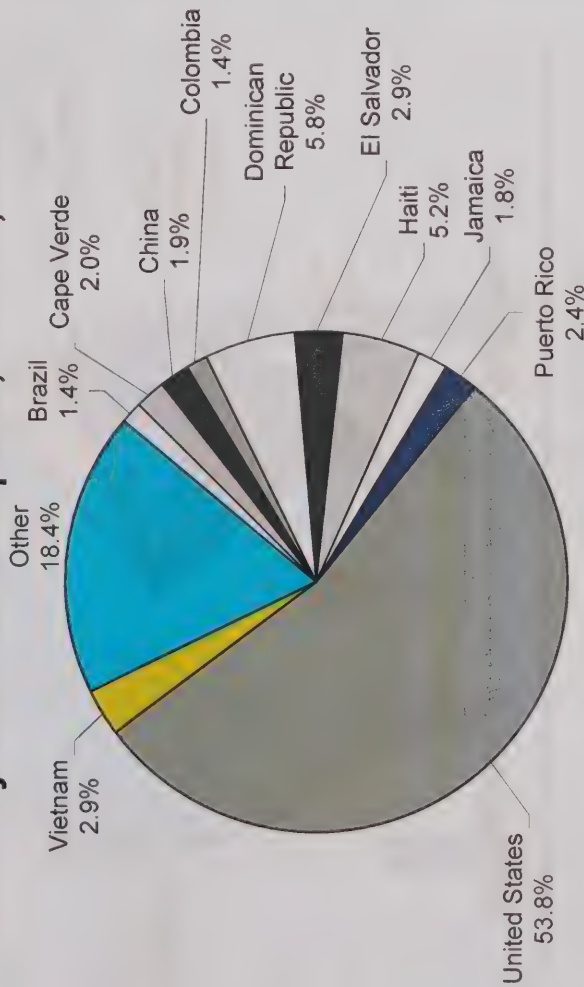
- A majority (n=1,673) (57.6%) of the 2,907 White births in 2003 for whom information on ancestry was reported were to women who reported their ancestry as "American."
- Close to a third of births to White women (n=929) (32.0%) were to women of European ancestry.



## MATERNAL CHARACTERISTICS

### *Birthplace*

**Births by Maternal Birthplace, Boston, 2003**



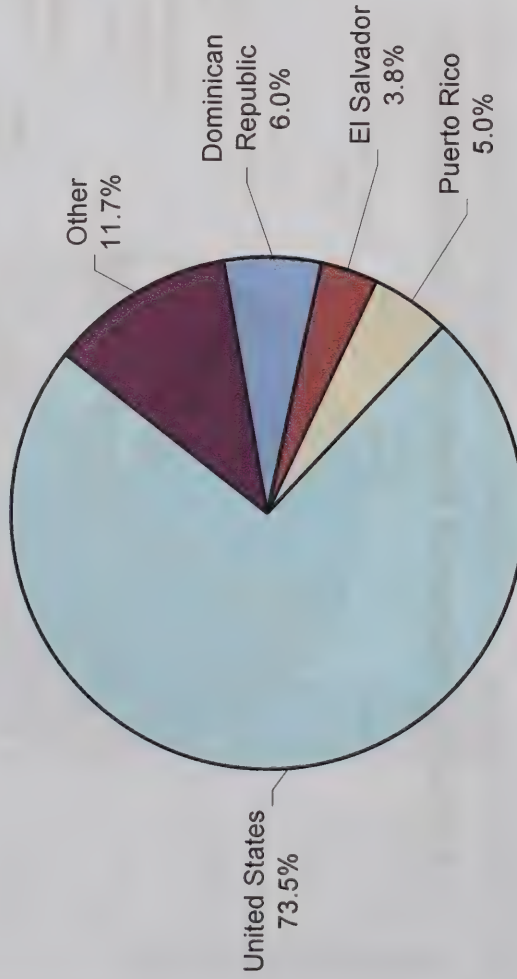
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission Research Office

- Of the 7,817 Boston births in 2003, 4,207 (53.8%) were to women born in the United States (includes all 50 states and the District of Columbia), and 3,610 (46.2%) were to women born in other countries.
- Women from the Dominican Republic had 452 Boston (5.8% of Boston births) in 2003. Haiti was the next most frequent birthplace of non-US-born Boston women, with 409 births (5.2% of births).
- In addition to the birthplaces shown in the chart at left, other countries, each with fewer than 100 Boston births, together represented 1,441 (18.4%) of the city's births in 2003.

## MATERNAL CHARACTERISTICS

### *Birthplace*

**Adolescent Births by Maternal Birthplace,  
Boston, 2001-2003**



NOTE: Adolescent mothers are defined as women ages 15 to 17.

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health

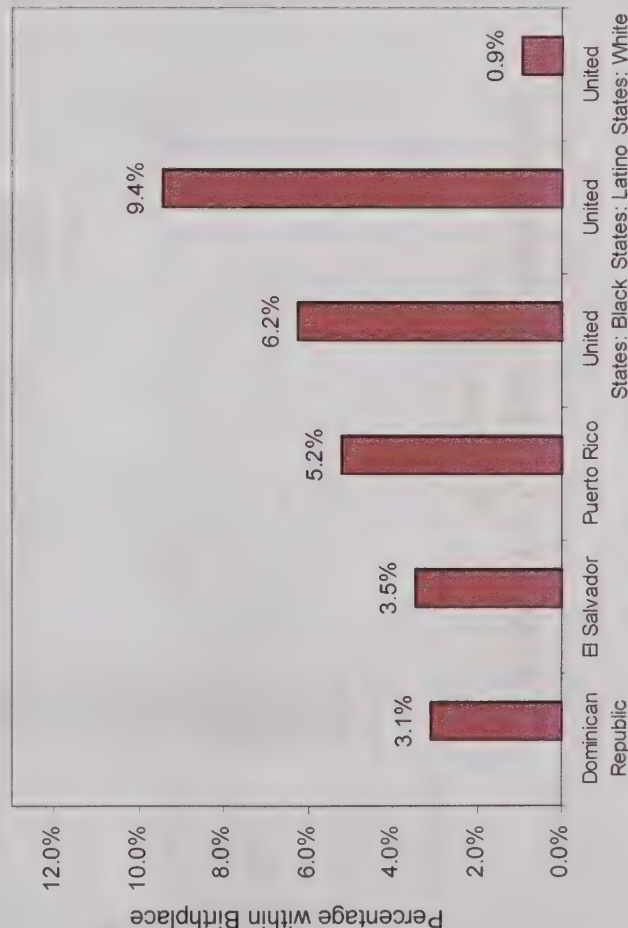
DATA ANALYSIS: Boston Public Health Research Office

- Between 2001 and 2003, 678 births occurred to Boston adolescents ages 15 to 17. Of these, 498 (73.5%) were to adolescents born in the United States (includes all 50 states and the District of Columbia), and 180 (26.5%) were to adolescents born in other countries.
- Adolescents from the Dominican Republic had 41 births (6.1% of Boston adolescent births). Puerto Rico was the next most frequent birthplace of non-US-born Boston adolescent mothers, with 34 births (5.0% of adolescent births).
- In addition to the birthplaces shown in the chart at left, other countries together represented the remaining 79 (11.7%) of the city's births to adolescents in 2001-2003.

# MATERNAL CHARACTERISTICS

## Birthplace

Adolescent Births by Maternal Birthplace as a Percent of Total Maternal Birthplace Births, Boston, 2001-2003



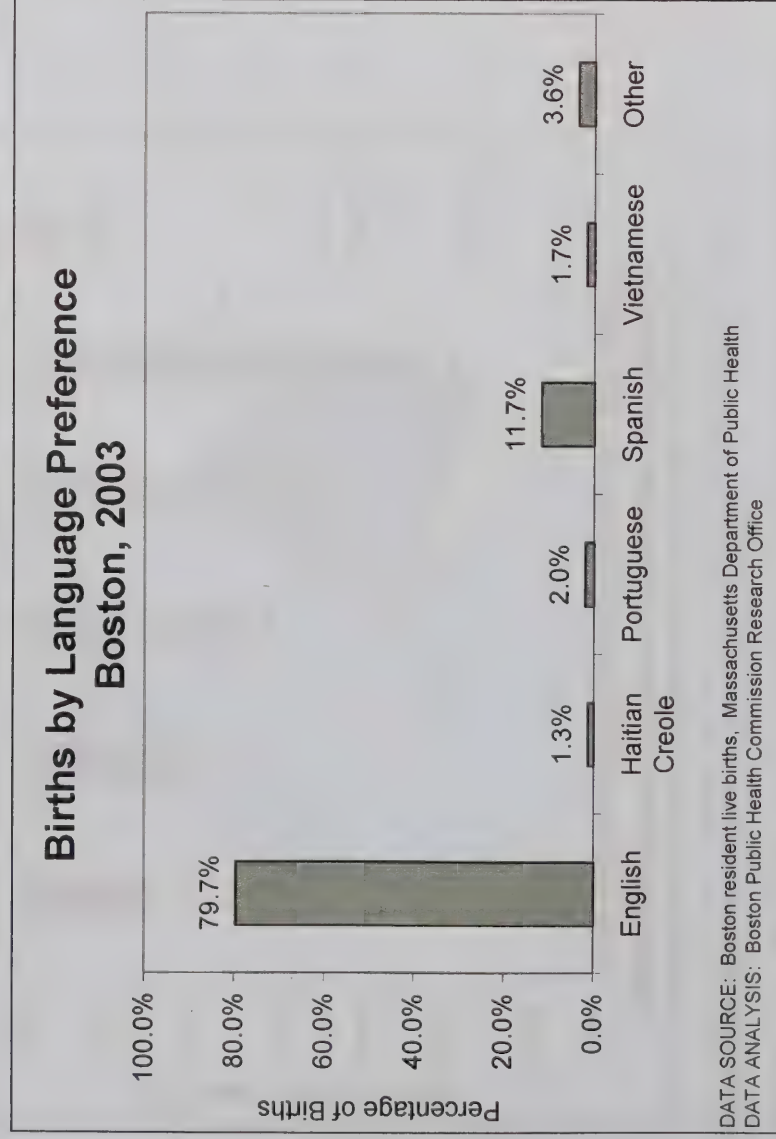
NOTE: Adolescent births are defined here as births to women ages 15 to 17.  
 DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health.  
 DATA ANALYSIS: Boston Public Health Commission Research Office.

- Between 2001 and 2003, 24,053 total births occurred to Boston women. Births to adolescents ages 15-17 represented 2.8% of the total.
- The percentage of births to adolescents varied considerably by maternal birthplace and race/ethnicity. Adolescent births to Latinas (n=133) born in the United States represented 9.4% of all births to U.S.-born Latinas. In contrast, adolescent births to Latinas born in Puerto Rico (n=33) represented 5.2% of all births to Latino women born in Puerto Rico, and adolescent births to women born in the Dominican Republic (n=40) represented 3.0% of all births to women from the Dominican Republic.
- Births to U.S.-born Black adolescents (n=264) represented 6.3% of all births to U.S.-born Blacks. Adolescent births to U.S.-born Whites (n=64) represented 0.9% of all births to U.S.-born Whites.



## MATERNAL CHARACTERISTICS

### Language Preference



- English was the mother's preferred language noted on 79.7% of all Boston birth certificates (n=6,218 births) in 2003.
- Spanish was the mother's preferred language indicated on 11.7% of all birth certificates (n=914 births).
- Portuguese, the language preference indicated for 155 births, Vietnamese (n=134 births), and Haitian Creole (n=103 births) were the next most common language preferences.
- Languages included in the "Other" category were American Sign, Arabic, Cambodian, Cantonese, Mandarin, Russian, and others. Each of these was indicated on fewer than 100 birth certificates.

# MATERNAL CHARACTERISTICS

## Language Preference

Births by Language Preference and Neighborhood Boston, 2003									
	English	Cantonese	Haitian Creole	Portuguese	Spanish	Vietnamese	Other	Total	
Allston/Brighton	72.9%	1.9%	--	7.1%	11.6%	--	5.3%	100.0%	
Back Bay	93.2%	--	--	--	--	--	4.8%	100.0%	
Charlestown	86.3%	--	--	--	9.3%	--	3.2%	100.0%	
East Boston	43.9%	--	--	4.5%	46.7%	1.0%	3.1%	100.0%	
Fenway	81.5%	--	--	--	10.4%	--	5.9%	100.0%	
Hyde Park	86.3%	--	3.9%	--	7.7%	--	--	100.0%	
Jamaica Plain	81.0%	--	--	--	15.3%	--	2.0%	100.0%	
Mattapan	89.0%	--	6.2%	--	2.9%	--	--	100.0%	
North Dorchester	77.2%	--	1.7%	4.2%	8.8%	5.9%	2.1%	100.0%	
North End	95.2%	--	--	--	--	--	--	100.0%	
Roslindale	83.9%	--	1.9%	--	10.9%	--	2.3%	100.0%	
Roxbury	81.7%	--	--	0.8%	13.3%	--	3.3%	100.0%	
South Boston	86.6%	1.2%	--	--	9.4%	--	1.9%	100.0%	
South Dorchester	87.0%	--	2.7%	1.1%	4.0%	4.5%	0.7%	100.0%	
South End	78.8%	7.0%	--	--	5.7%	--	7.8%	100.0%	
West Roxbury	91.1%	--	1.1%	--	3.4%	--	3.2%	100.0%	

"--" <5 of neighborhood's birth certificate reported this language.

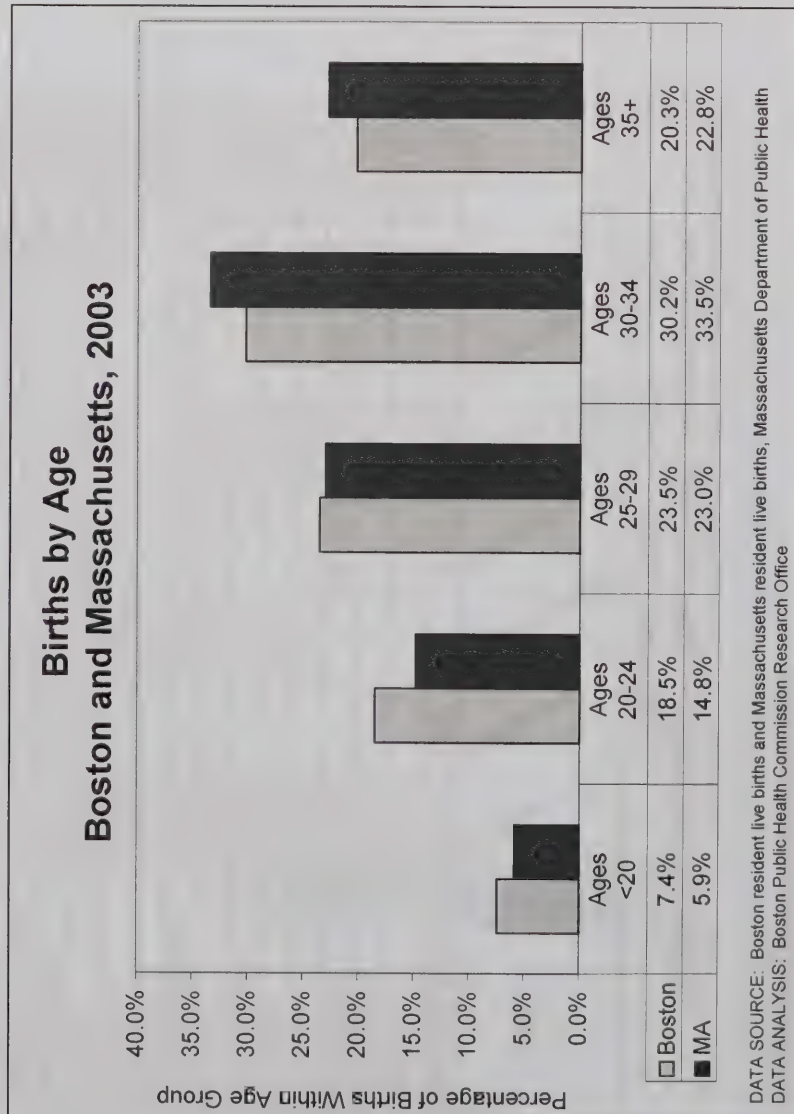
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health

DATA ANALYSIS: Boston Public Health Commission Research Office

- In 2003, English was the most common language preference on Boston birth certificates in all neighborhoods except East Boston, where Spanish was preferred. The percentage of birth certificates on which English was indicated as the preferred language ranged from a low of 43.9% in East Boston to 95.2% in the North End.
- The percentage of birth records with Spanish as the mother's preferred language also ranged widely, from 2.9% in Mattapan to 46.7% in East Boston.
- The Cantonese language in the South End, and Haitian Creole in Mattapan and Hyde Park, reflect other substantial language groups among Boston women giving birth in 2003. Portuguese in Allston/Brighton, and Vietnamese in North Dorchester, were also noted in significant numbers of 2003 birth records as the mother's preferred language.

# MATERNAL CHARACTERISTICS

## Age

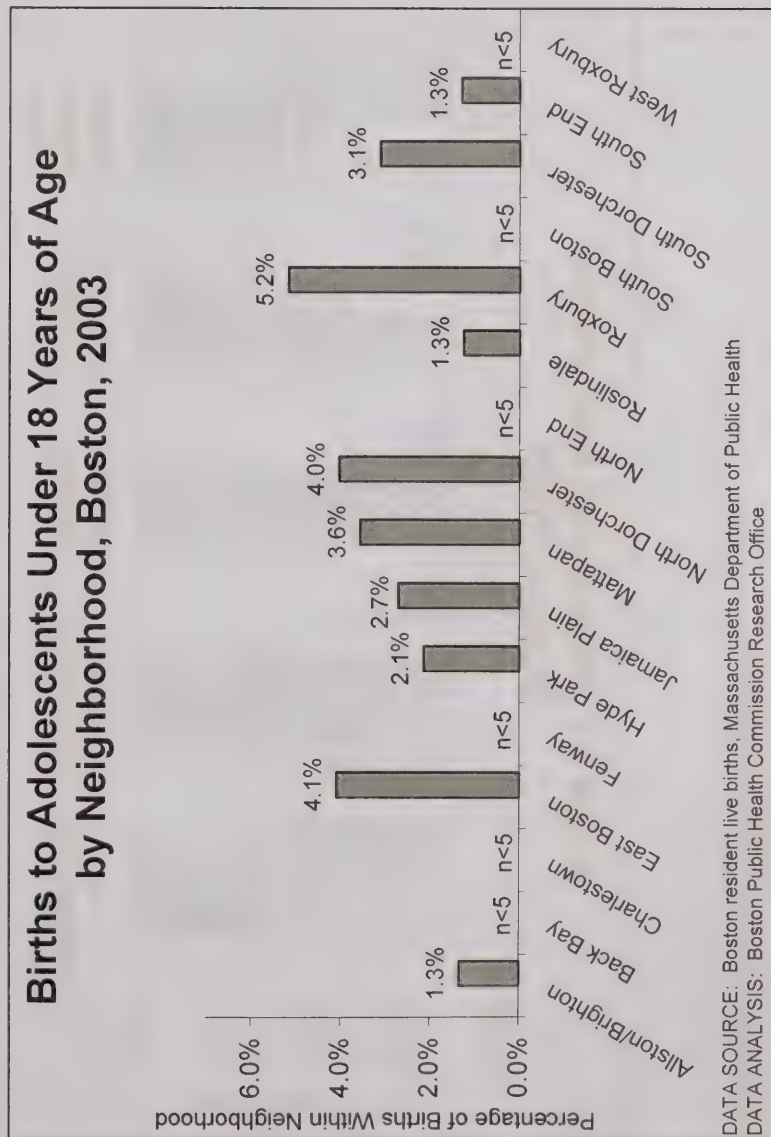


- Boston women who gave birth in 2003 were younger, as a group, than their Massachusetts counterparts. The state as a whole had higher percentages of births to women ages 30 and older, while Boston had higher percentages of births to women under age 30.



## MATERNAL CHARACTERISTICS

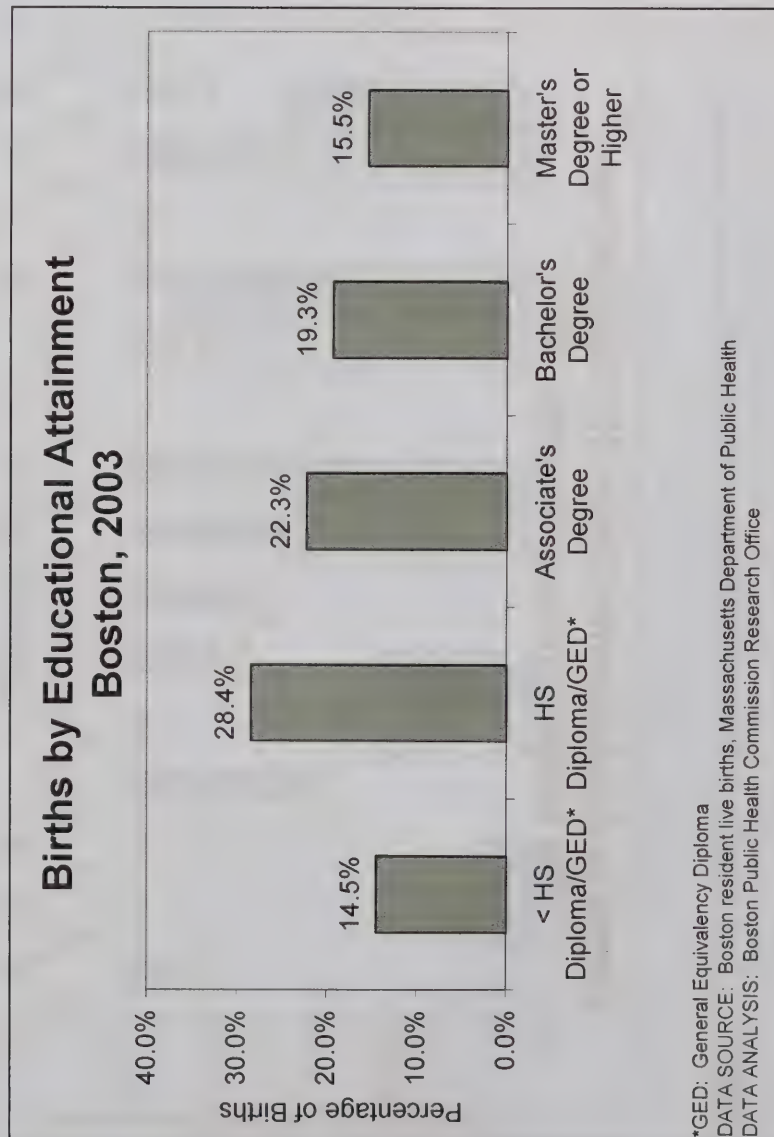
### Age



- In 2003, 206 Boston births (2.6% of all births) were to adolescents under the age of 18. These included 7 births to adolescents under age 15.
- Among all Boston neighborhoods, Roxbury, East Boston, and North Dorchester had the highest percentages of births to adolescents.

## MATERNAL CHARACTERISTICS

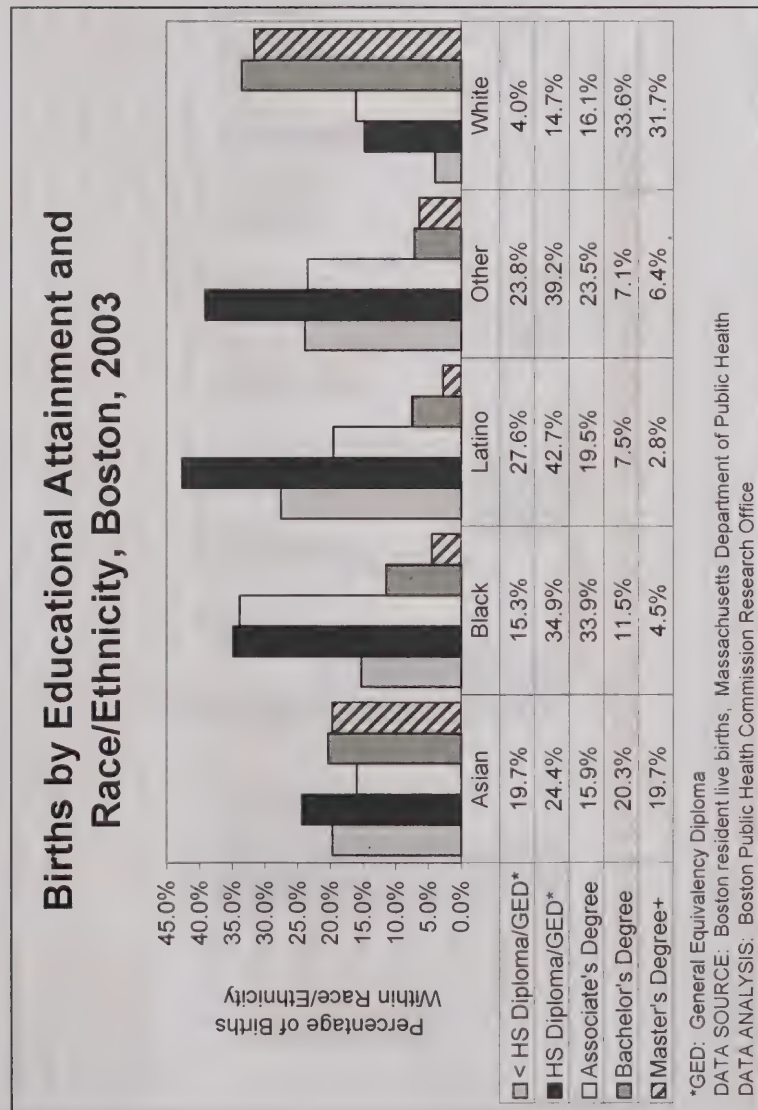
### *Educational Attainment*



- About one in seven Boston births in 2003 (n=1,129) (14.5%) were to women without a high school diploma or equivalent.
- More than half (n=4,454) (57.1%) of births were to women who had attained an associate's or higher degree.

# MATERNAL CHARACTERISTICS

## Educational Attainment



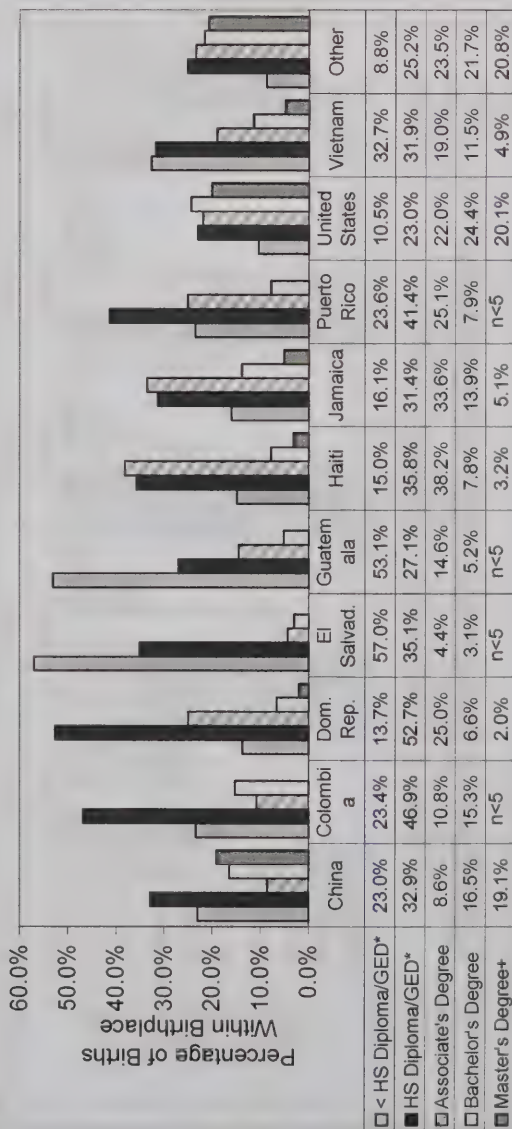
- The level of education of Boston women who give birth differs by race/ethnicity, with Latinas and Black women generally having lower levels of educational attainment than Asian and White women.
- In 2003, 40.0% (n=246) of Asian births and 65.2% (n=1,895) of White births were to women with at least a bachelor's degree education. In contrast, 16.0% (n=360) of Black births and 10.2% (n=178) of Latino births were to women with at least a bachelor's degree education.
- One in twenty-five (4.0%) (n=116) White births were to women with less than a high school education, a significantly lower percentage than among births to women in the other race/ethnicity groups [(27.6%) (n=480) for Latinas, (19.7%) (n=121) for Asians, and (15.3%) (n=344) for Blacks].



# MATERNAL CHARACTERISTICS

## Educational Attainment

**Births by Education and Maternal Birthplace  
Boston, 2003**



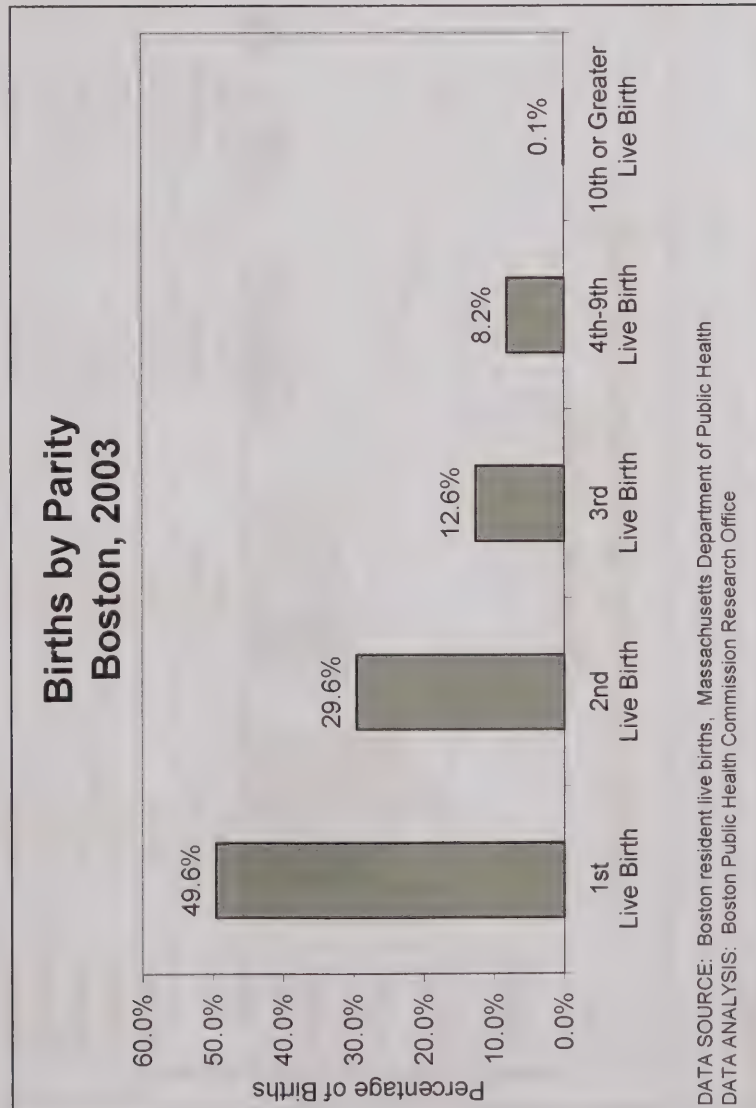
\*GED: General Equivalency Diploma

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission Research Office

- In 2003, the highest percentage of births to women without a high school education was among women from El Salvador (n=130) (57.0%). Low educational attainment was also common among women from Guatemala (n=51) (53.1%), Vietnam (n=74) (32.7%), and Puerto Rico (n=45) (23.6%).

## MATERNAL CHARACTERISTICS

### Parity

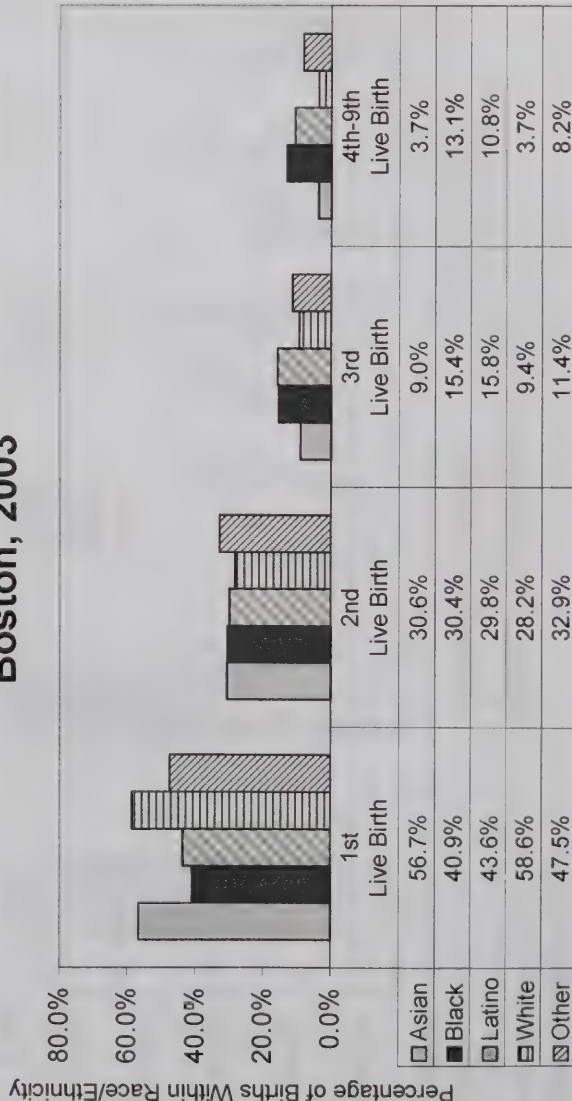


- In 2003, first births accounted for close to half (n=3,863) (49.6%) of all Boston births.
- More than nine in ten Boston births in 2003 (n=7,147) (91.8%) were to women having their first, second, or third baby.

# MATERNAL CHARACTERISTICS

## Parity

**Births by Parity and Race/Ethnicity  
Boston, 2003**



NOTE: Parity 10 or higher is not shown because the frequency of these births was <5 for all but one race/ethnicity group.

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health

DATA ANALYSIS: Boston Public Health Commission Research Office

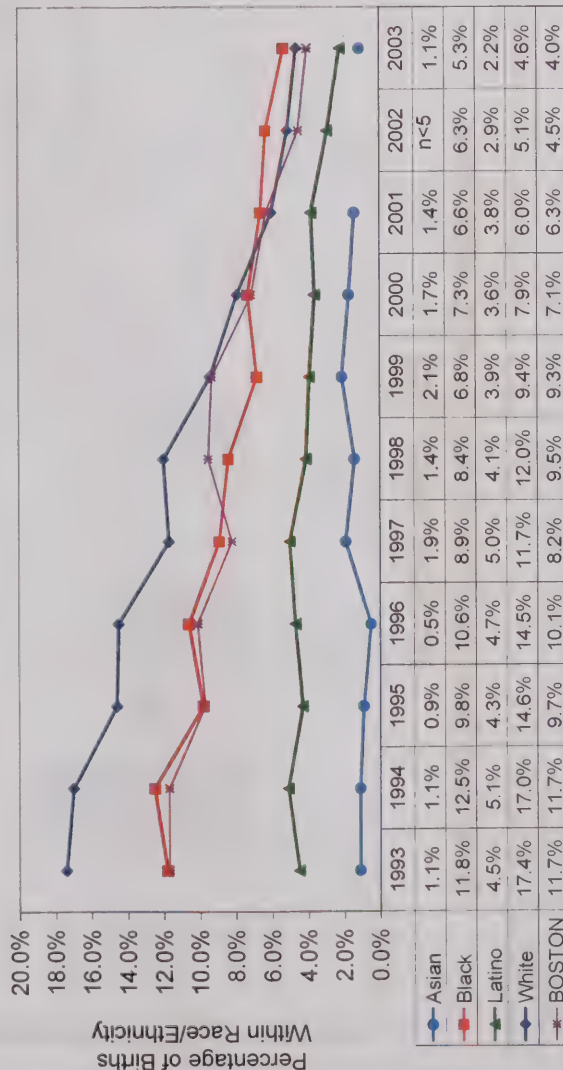
- More than half of Asian and White births in 2003 were to women who were primiparous, that is, having their first baby.
- Generally equal proportions of births in each race/ethnicity group were to women having their second child.
- Higher percentages of Black and Latino births were third-born or greater, compared with Asian and White births.



# MATERNAL CHARACTERISTICS

## Smoking

Smoking During Pregnancy by Race/Ethnicity and Year, Boston, 1993-2003



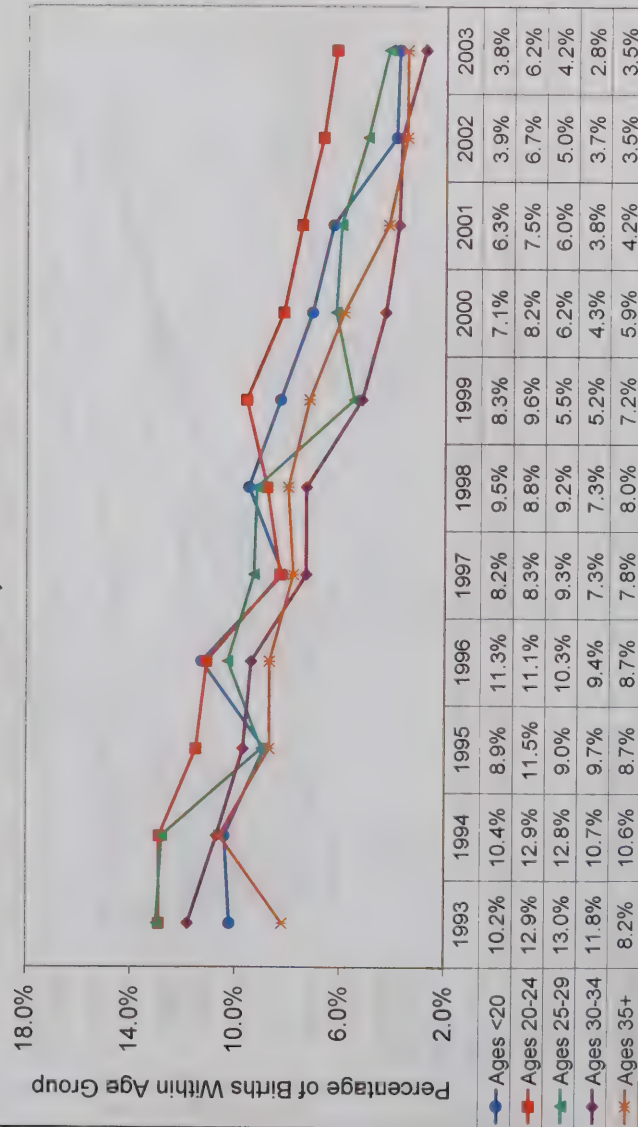
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission Research Office

- The percentage of self-reported maternal smoking during pregnancy declined 65.8% between 1993 and 2003, to 4.0% of all births (n=310). The decrease was a statistically significant change.
- The biggest decline between 1993 and 2003 was among Whites, whose reported prenatal smoking prevalence fell 73.6% (n=134 in 2003). There was a 55.1% decrease among Blacks (n=120 in 2003) and a 51.1% decline among Latinas (n=39 in 2003).
- Since 2001, the prevalence of reported smoking among Blacks has surpassed that among Whites, reversing a 9-year trend.

# MATERNAL CHARACTERISTICS

## Smoking

Smoking During Pregnancy by Age and Year  
Boston, 1993-2003

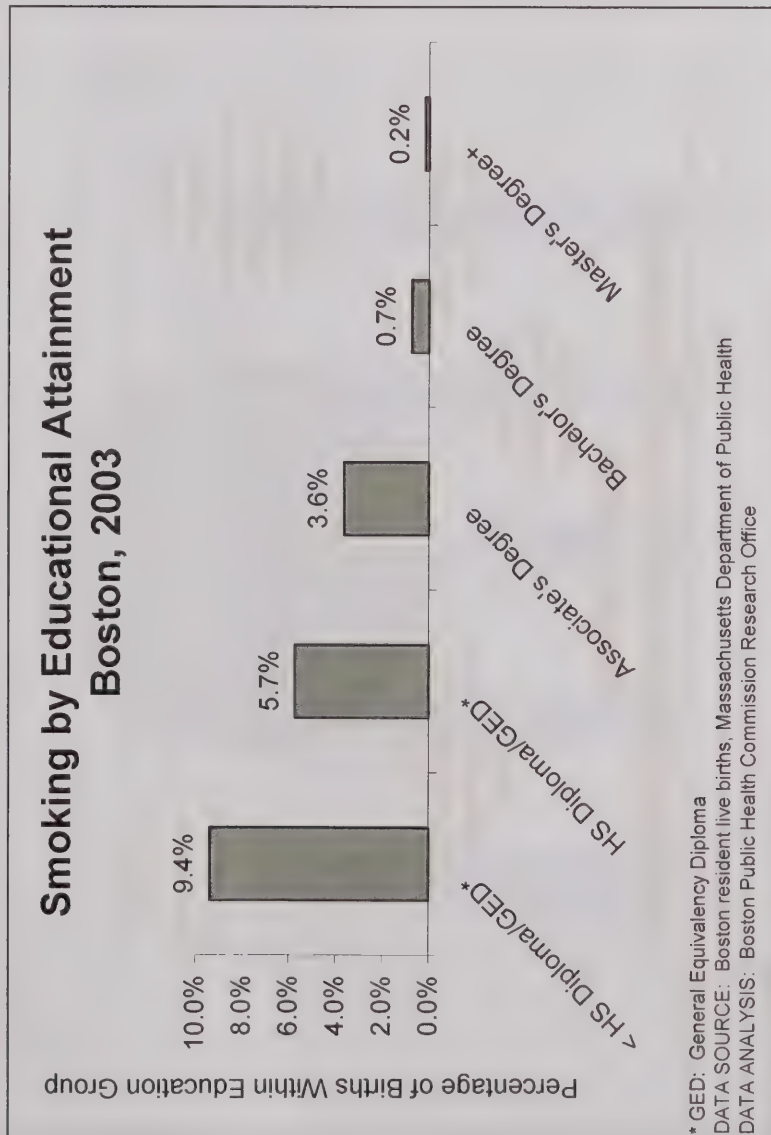


DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission Research Office

- Births to women in their early twenties had the highest level of prenatal smoking (n=89) of all births to Boston women in 2003.
- The lowest level of prenatal smoking was among women ages 30-34 (n=66).
- Between 1993 and 2003, the percentage of births that were to women who reported smoking during pregnancy declined for all age groups. These changes in smoking status were statistically significant for all age groups.

# MATERNAL CHARACTERISTICS

## Smoking

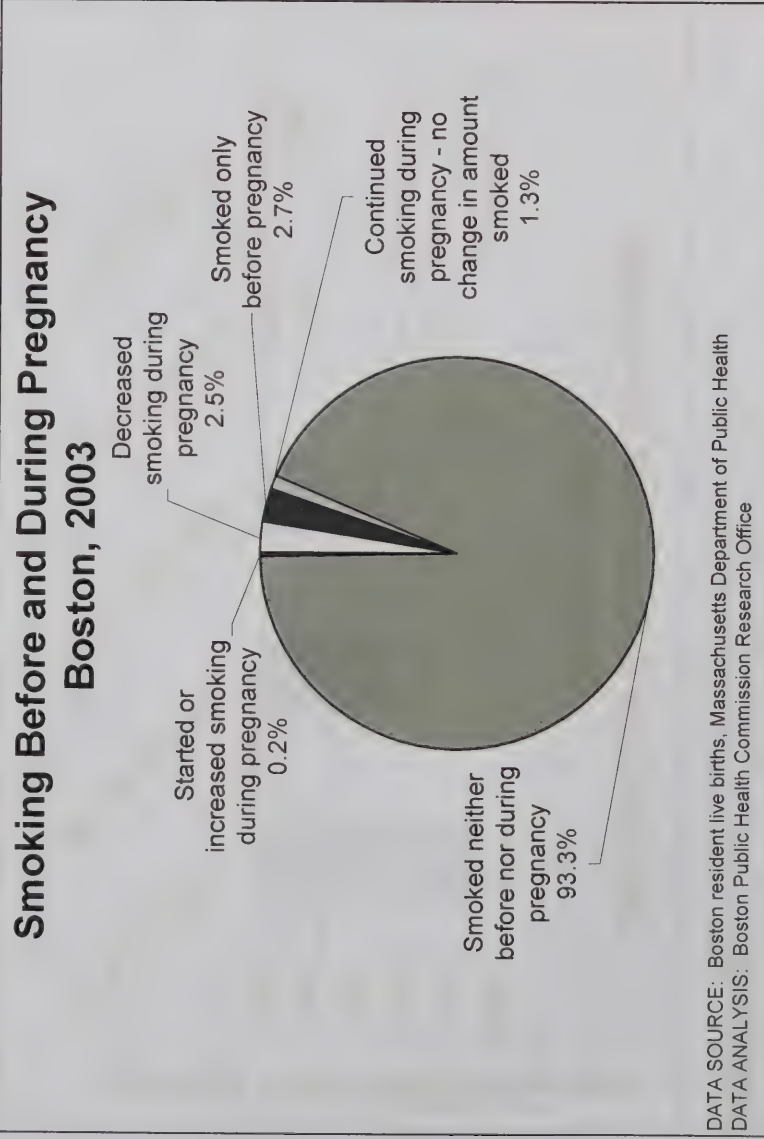


- Women with at least a bachelor's degree were significantly less likely to have smoked during pregnancy than were women with less education.
- The negative relationship between maternal education and reported smoking during pregnancy is statistically significant at lower levels of education as well, so that as maternal education decreases, reported smoking during pregnancy increases.



## MATERNAL CHARACTERISTICS

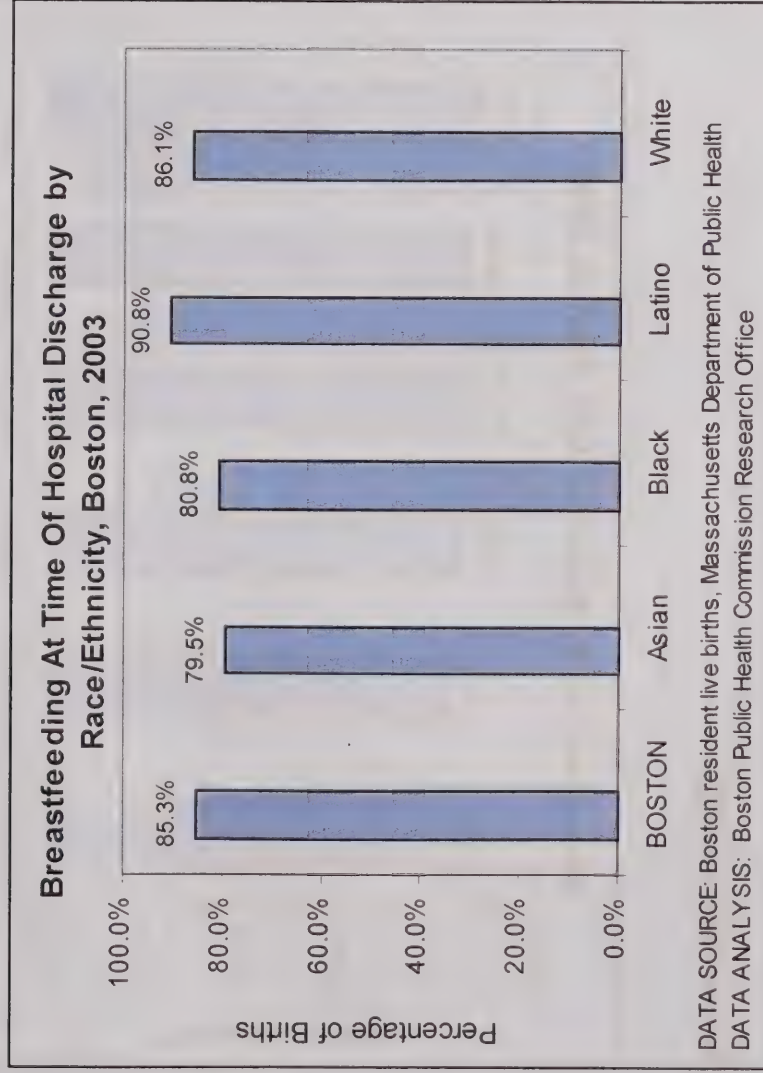
### Smoking



- The vast majority of Boston resident births (n=7,276) (93.3%) were to women who said they had smoked neither before nor during pregnancy.
- 2.7% (n=212) of births were to women who stated that they had smoked only before pregnancy.
- 2.5% (n=194) of births were to women who reported cutting back during pregnancy on the number of cigarettes they smoked.
- The remaining percentages of births were to women who either smoked the same amount they had before pregnancy (n=102) (1.3%), or began or increased smoking during pregnancy (n=13) (0.2%).

## MATERNAL CHARACTERISTICS

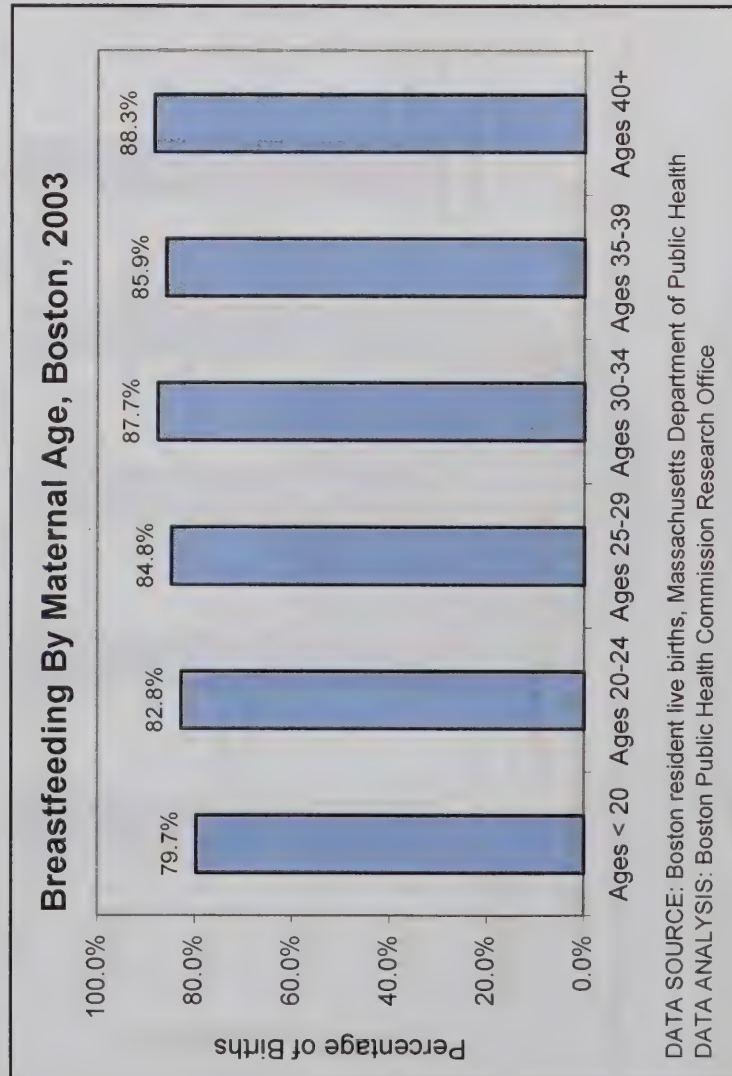
### *Breastfeeding*



- The majority of infants (85.3%) (n=6,640) born in 2003 were breastfed at the time of their discharge from the hospital.
- Breastfeeding was most common among infants born to Latinas, and least common among infants born to Asian mothers.

## MATERNAL CHARACTERISTICS

### *Breastfeeding*

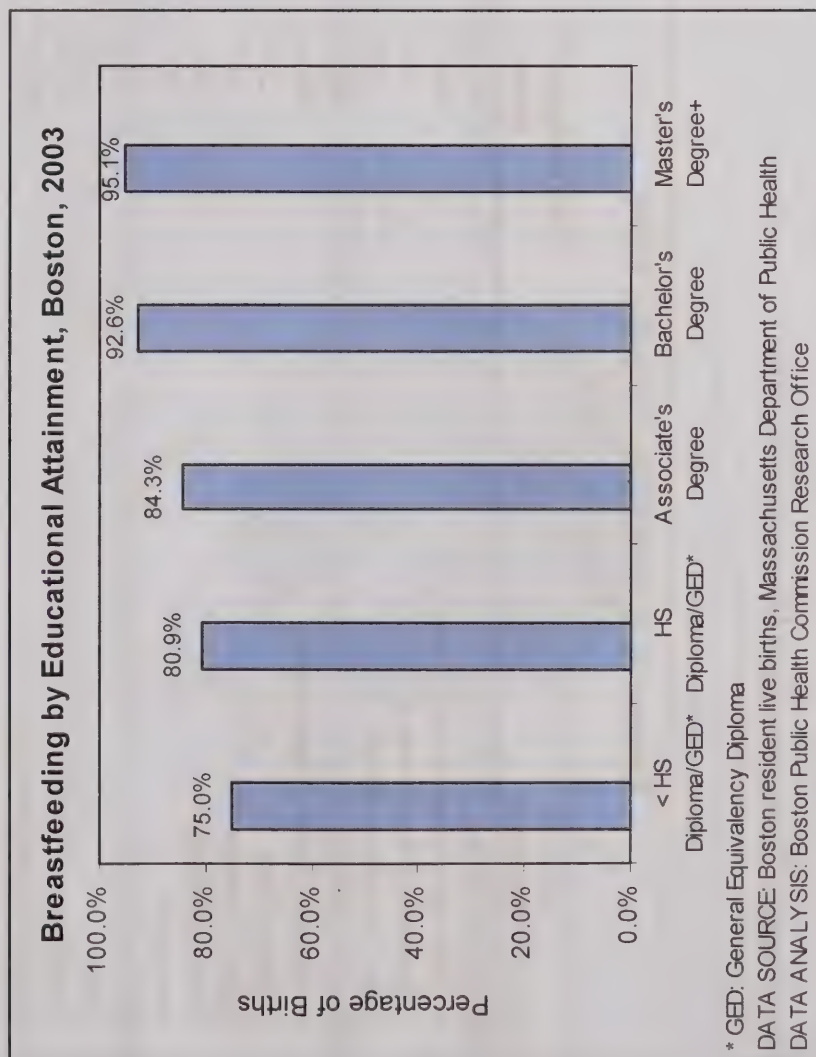


- Infants born to women ages 40 and older were more commonly breastfed at the time of hospital discharge than were infants born to mothers of other ages.
- Over 85% (n=3,428) of infants born to mothers ages 30 and older were breastfed at the time of hospital discharge.
- Breastfeeding at the time of hospital discharge was least common among infants born to mothers under 20 years of age.



## MATERNAL CHARACTERISTICS

### *Breastfeeding*



- Breastfeeding was most common among infants born to mothers with a master's degree or more education.
- The lowest level of breastfeeding was among infants born to mothers with less than a high school diploma.

## MATERNAL CHARACTERISTICS

*Payment Source for Prenatal Care*

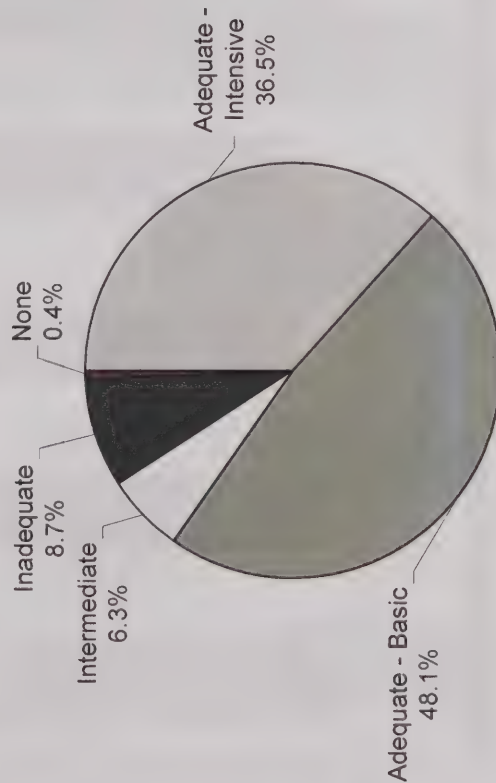
Payment Source for Prenatal Care Boston, 2003	
Source of Payment	Percentage of Births
<b>Private Insurance</b>	<b>53.1</b>
Health maintenance organization	44.8
Commercial Insurance	5.4
Blue Cross/Blue Shield	2.8
<b>Public Insurance</b>	<b>45.3</b>
Medicaid/SCHIP (MassHealth)	38.8
Healthy Start	2.2
Other Government	3.3
Free Care Pool	0.8
Medicare	0.1
<b>Other Insurance</b>	<b>1.7</b>
Other	0.9
Self-Pay	0.7
Worker's Compensation	N<5
DATA SOURCE: Boston resident live births. Massachusetts Department of Public Health DATA ANALYSIS: Boston Public Health Commission Research Office	

- In 2003, payment sources for the prenatal care (PNC) of Boston residents were closely divided between private insurers and publicly funded sources such as MassHealth, the state of Massachusetts' combined program for Medicaid and the state Children's Health Insurance Program.
- Other sources of payment for prenatal care include self-pay and miscellaneous other payers.
- Of prenatal care paid for by private insurance, most was covered by health maintenance organizations.
- MassHealth was the largest public payer for prenatal care, covering close to four in ten Boston births (38.8%).

## MATERNAL CHARACTERISTICS

### Adequacy of Prenatal Care Utilization

**Adequacy of Prenatal Care Utilization  
Boston, 2003**



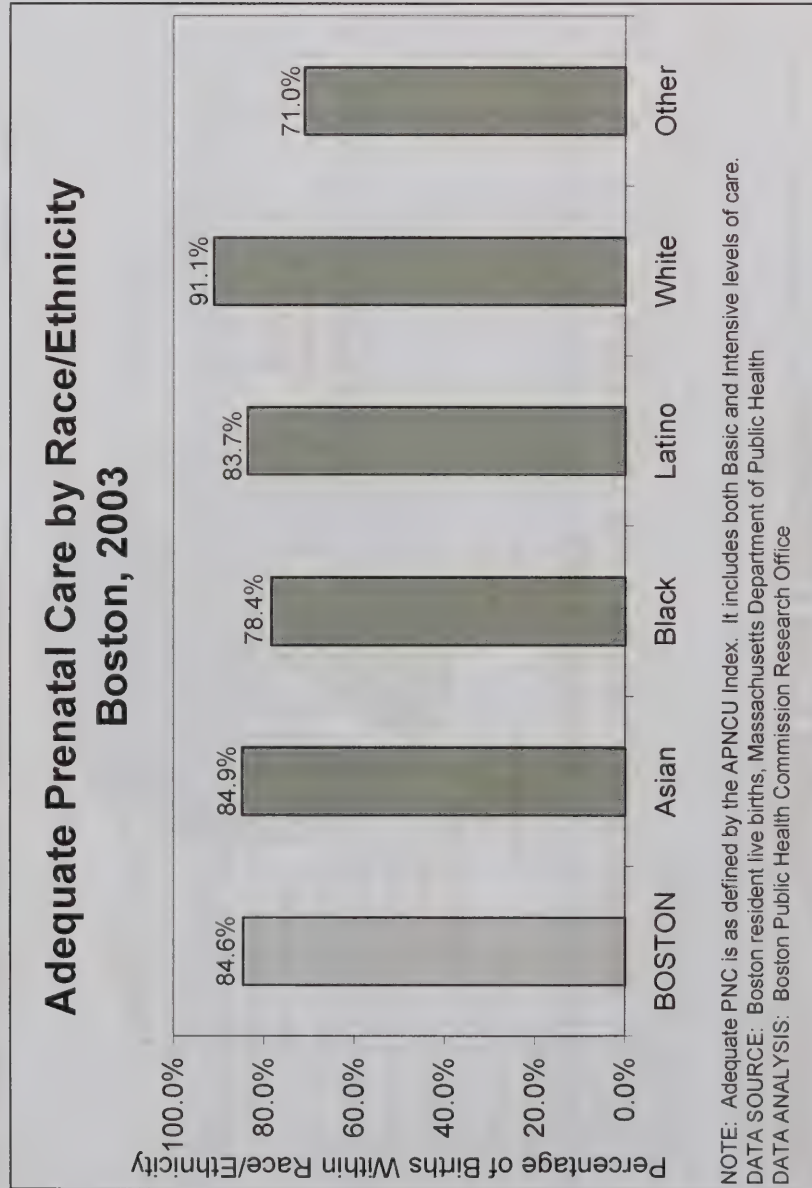
NOTE: Adequacy is as defined by the APNCU Index (Kotelchuck Index).  
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission Research Office

- In 2003, 84.6% (n=6,502) of Boston births were to women whose prenatal care utilization was adequate, defined as an appropriate number of visits for the length of gestation and a relatively early initiation of prenatal care.
- Women whose care falls into the **Adequate - Basic** category typically have had low-risk pregnancies that required only routine prenatal visits. Those whose utilization falls into the **Adequate - Intensive** category typically have had more frequent visits to monitor pregnancy risks or manage complications of pregnancy.



## MATERNAL CHARACTERISTICS

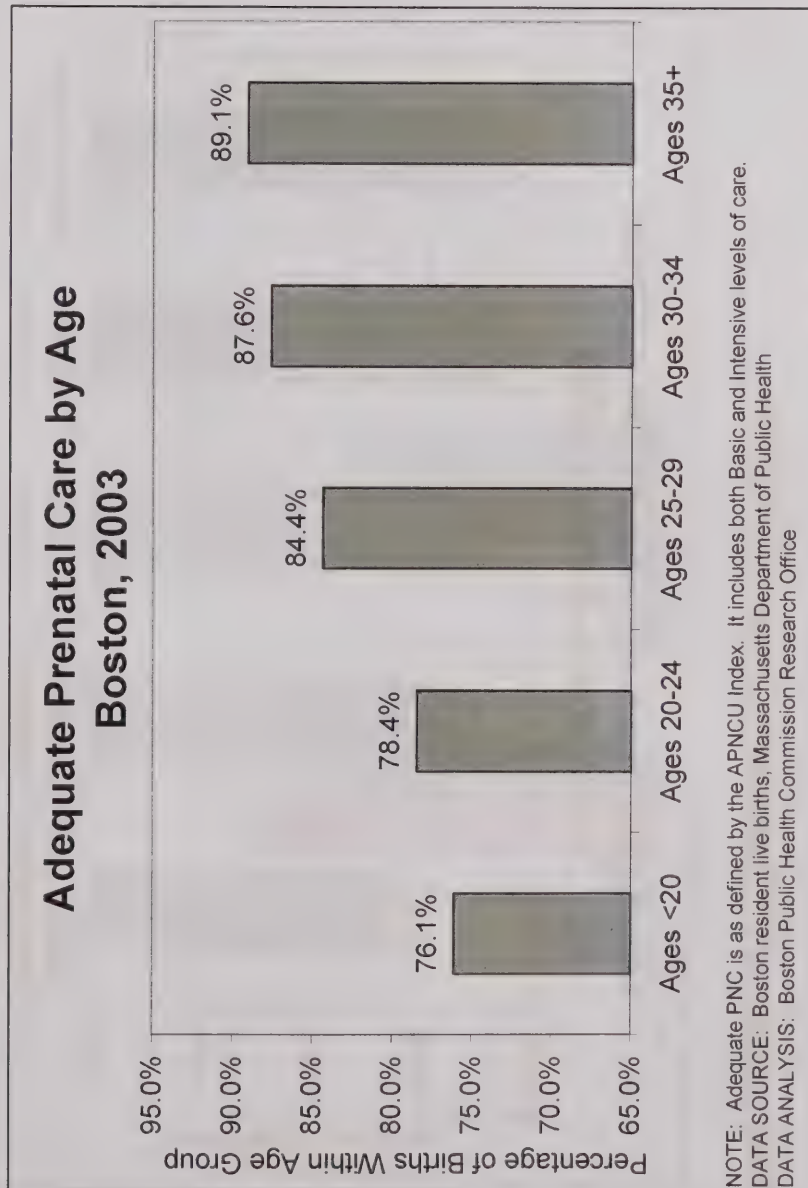
### *Adequacy of Prenatal Care Utilization*



- Most births to Boston women in all race/ethnicity groups had adequate prenatal care (includes Adequate-Basic and Adequate-Intensive) in 2003, but the highest percentage of adequate prenatal care was among births to White women. Almost 91.1% (n=2,634) of births to White women had adequate care.
- Adequate prenatal care was significantly more common among births to White women than among births to Asian and Black women and Latinas.
- Adequate prenatal care utilization was significantly less frequent among births to women of Other race/ethnicity compared with Asian, Black, Latino, and White women.

## MATERNAL CHARACTERISTICS

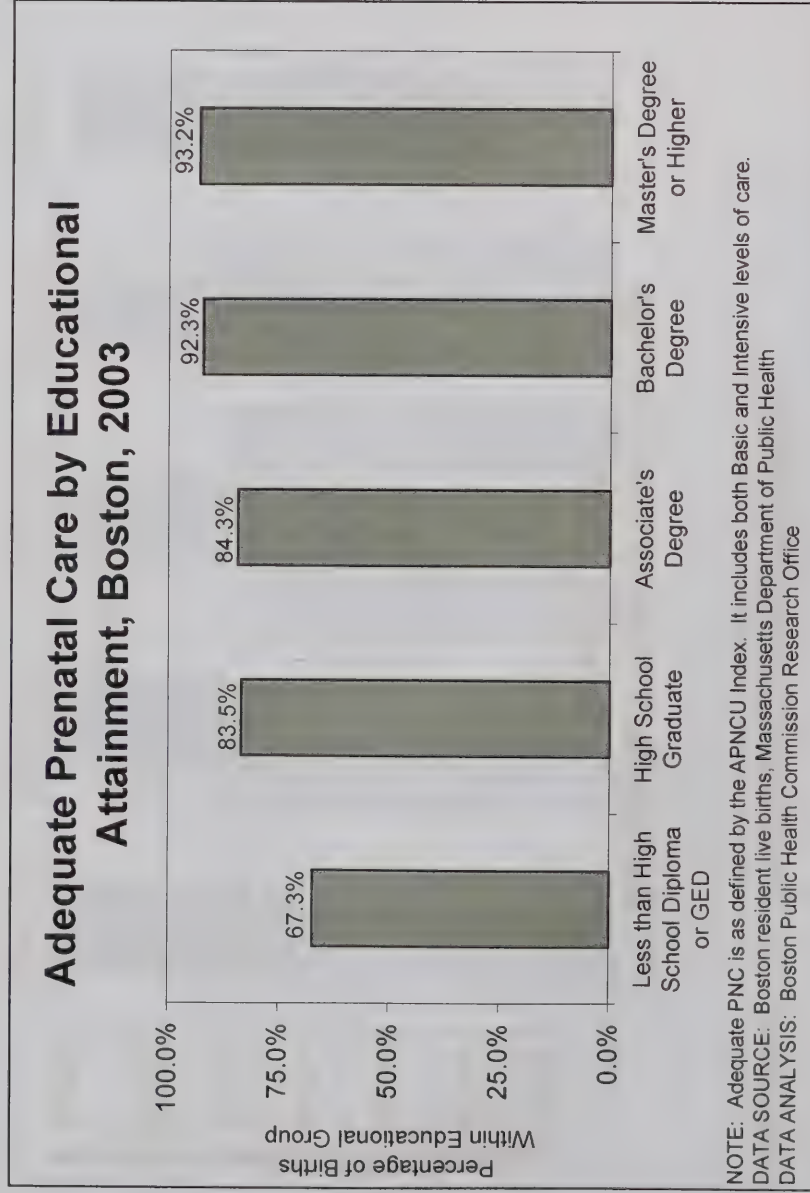
### *Adequacy of Prenatal Care Utilization*



- In 2003, women ages 35 to 50 had the highest percentage of adequate (Adequate-Basic and Adequate-Intensive) prenatal care utilization.
- Women less than 20 years old had the lowest percentage of adequate prenatal care utilization.

## MATERNAL CHARACTERISTICS

### *Adequacy of Prenatal Care Utilization*

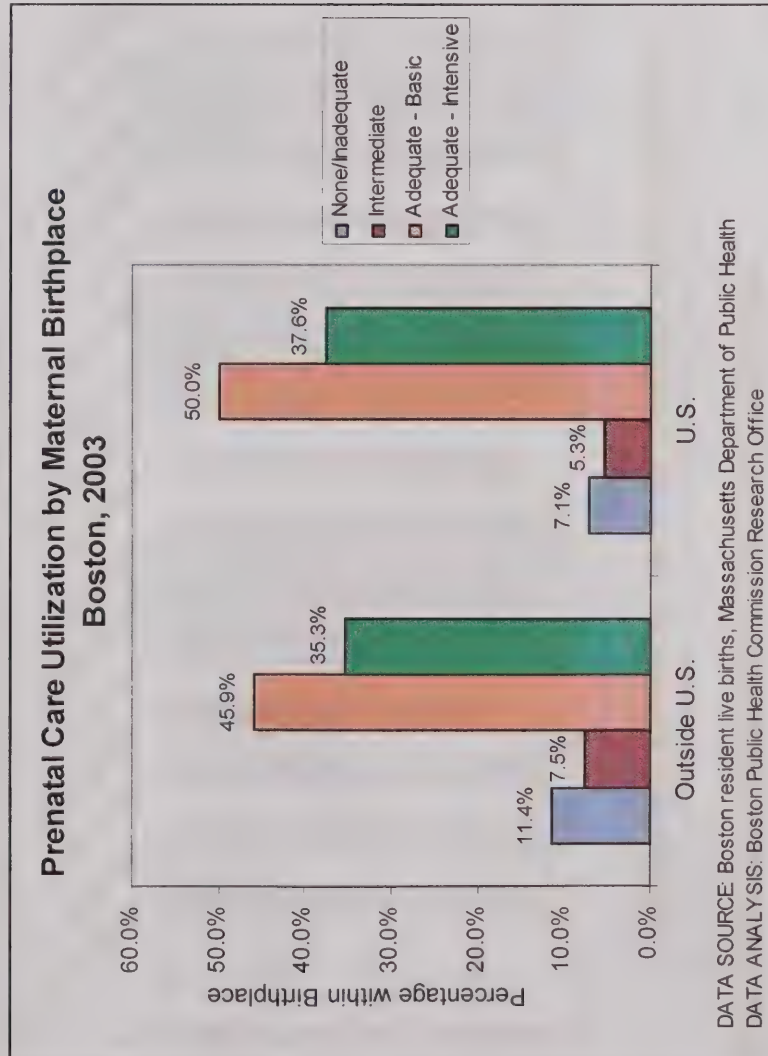


- Prenatal care adequacy is higher among births to women with more education.
- Births to Boston women who did not have at least a high school education or GED had the lowest percentage of adequate prenatal care utilization in 2003. Less than 70% (n=740) of births to poorly educated women received adequate prenatal care, though almost 94% (n=1,124) of births to women with at least a master's degree received adequate prenatal care.



## MATERNAL CHARACTERISTICS

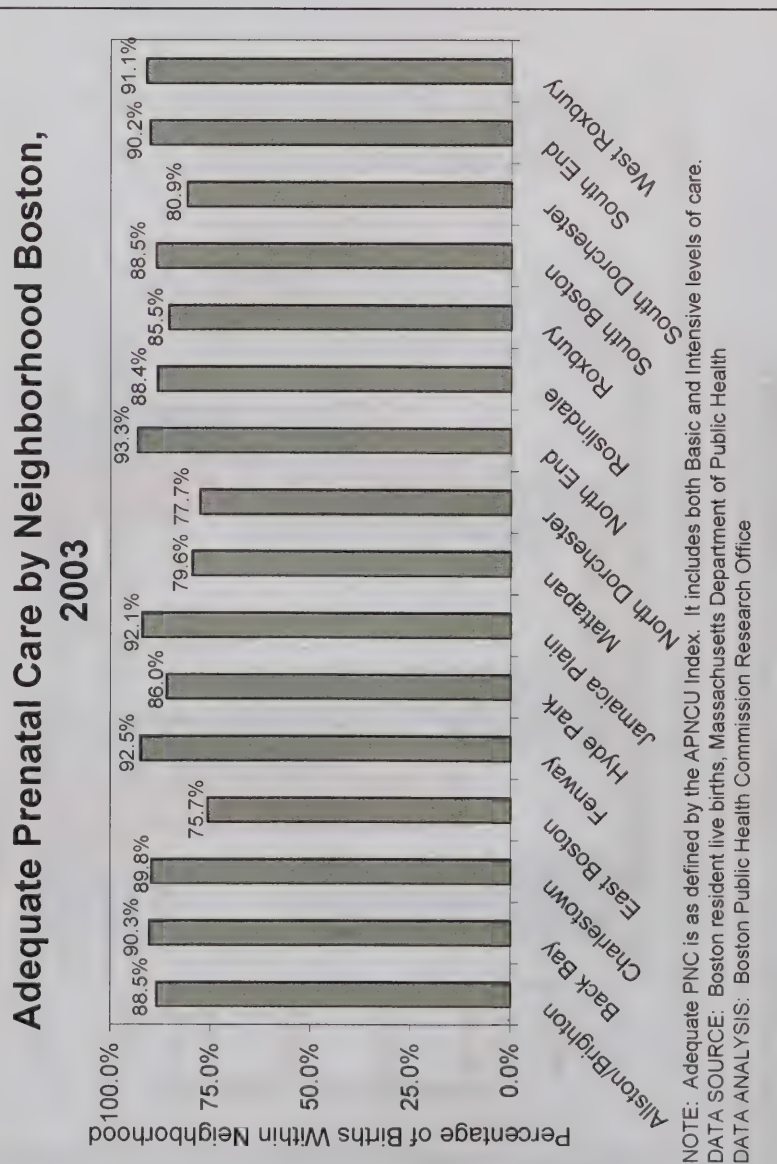
### *Adequacy of Prenatal Care Utilization*



- Boston women born in the U.S. (includes all 50 states and the District of Columbia) had slightly higher percentages of Adequate-Basic and Adequate-Intensive prenatal care utilization than did births to women born outside the U.S.

# MATERNAL CHARACTERISTICS

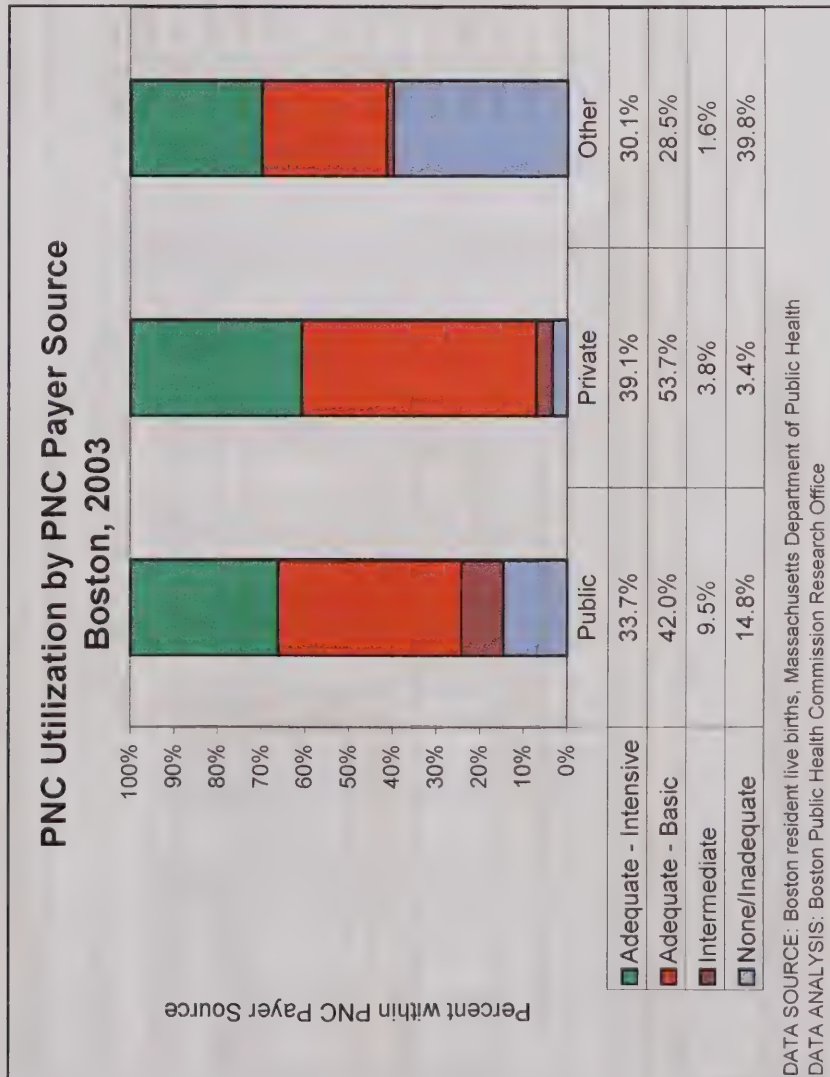
## Adequacy of Prenatal Care Utilization



- Adequacy of prenatal care also varied by neighborhood in 2003. The percentage of births to women who received adequate prenatal care ranged from a low of 75.7% (n=511) in East Boston to a high of 93.3% (n=97) in the North End.

# MATERNAL CHARACTERISTICS

## Adequacy of Prenatal Care Utilization



- The type of payer for prenatal care is associated with adequacy of prenatal care utilization.
- Women whose prenatal care was paid for by public sources had higher percentages of prenatal care utilization at the Intermediate or Inadequate/None levels than did women whose prenatal care was paid for by private insurance.
- Women whose prenatal care was paid for by Other sources (such as self-pay) had a much higher percentage of utilization at the Inadequate/None level than did women whose care was paid for by public or private sources.



## MATERNAL CHARACTERISTICS

### Adequacy of Prenatal Care Utilization

Logistic regression is a statistical technique that can be used to assess factors that may be related to the likelihood that women will have adequate prenatal care utilization. Multiple factors can be measured simultaneously, making comparisons across groups possible. The results indicate how strong an association each factor or characteristic has while the others are being held constant.

Adjusted Odds Ratios for Adequate Prenatal Care Boston, 2003				
	One Year Increase	Adequate Prenatal Care		
		Adjusted Odds Ratio	Lower 95% CI	Upper 95% CI
Maternal Age		1.026	1.013	1.039
Race/Ethnicity				
	Asian	1.03	0.78	1.38
	Black	0.66	0.54	0.79
	Latino	1.25	1.00	1.56
	Other	0.54	0.40	0.75
	White*	1.00		
Plurality				
	Singleton*	1.00		
	Twins or Higher	5.49	2.69	11.22
Smoking During Pregnancy				
	No*	1.00		
	Yes	0.31	0.23	0.40
Maternal Birthplace				
	US*	1.00		
	Other**	0.63	0.54	0.73
Educational Attainment				
	Less Than High School Diploma	0.47	0.39	0.56
	HS Graduate/GED*	1.00		
	At Least Some College	0.94	0.79	1.11
Parity				
	1st Live Birth	1.00		
	Not 1st Live Birth	0.81	0.70	0.94
Insurance Coverage				
	Private or Other*	1.00		
	Public	0.45	0.39	0.54

\*Reference group

\*\*Includes Guam, Puerto Rico, and the Virgin Islands

NOTES: Adequacy is as defined by the APNCU (Kotelchuck) Index.

Marital status was not a significant predictor of prenatal care adequacy.

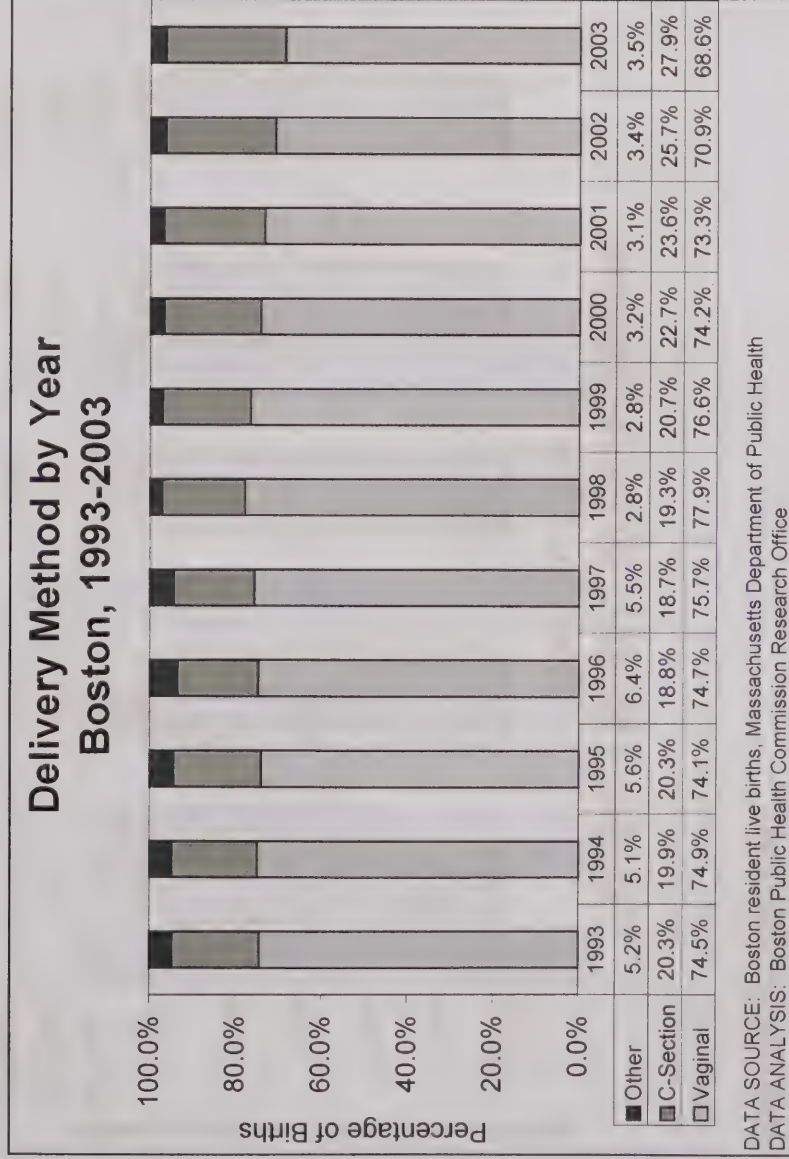
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health

DATA ANALYSIS: Boston Public Health Commission Research Office

- In 2003, maternal age was significantly related to the odds of adequate prenatal care utilization. Here, the odds ratio is interpreted to mean that for each additional year of maternal age, the odds of a birth's receiving adequate prenatal care increased about 2.6%. Mother's race was also related to prenatal care adequacy. Births to Black women were about 66% as likely, and births to Other race women were about 54% as likely, as births to White women to receive adequate PNC.
- When having twins or higher order births were five and a half times more likely than those with singletons to obtain adequate care. Women who smoked during pregnancy were about 31% as likely as nonsmokers to have adequate prenatal care utilization, and women born in a country outside the US were about 63% as likely as US-born women to do so.
- Women without a high school diploma were about half (47%) as likely as women with a high school diploma to have adequate prenatal care utilization.
- Women who had previously delivered a live birth were 81% as likely as women who delivered their first live birth to have adequate prenatal care utilization.
- Women with public insurance for their prenatal care were about 45% as likely as women with private or Other insurance to have an adequate level of prenatal care utilization.

## MATERNAL CHARACTERISTICS

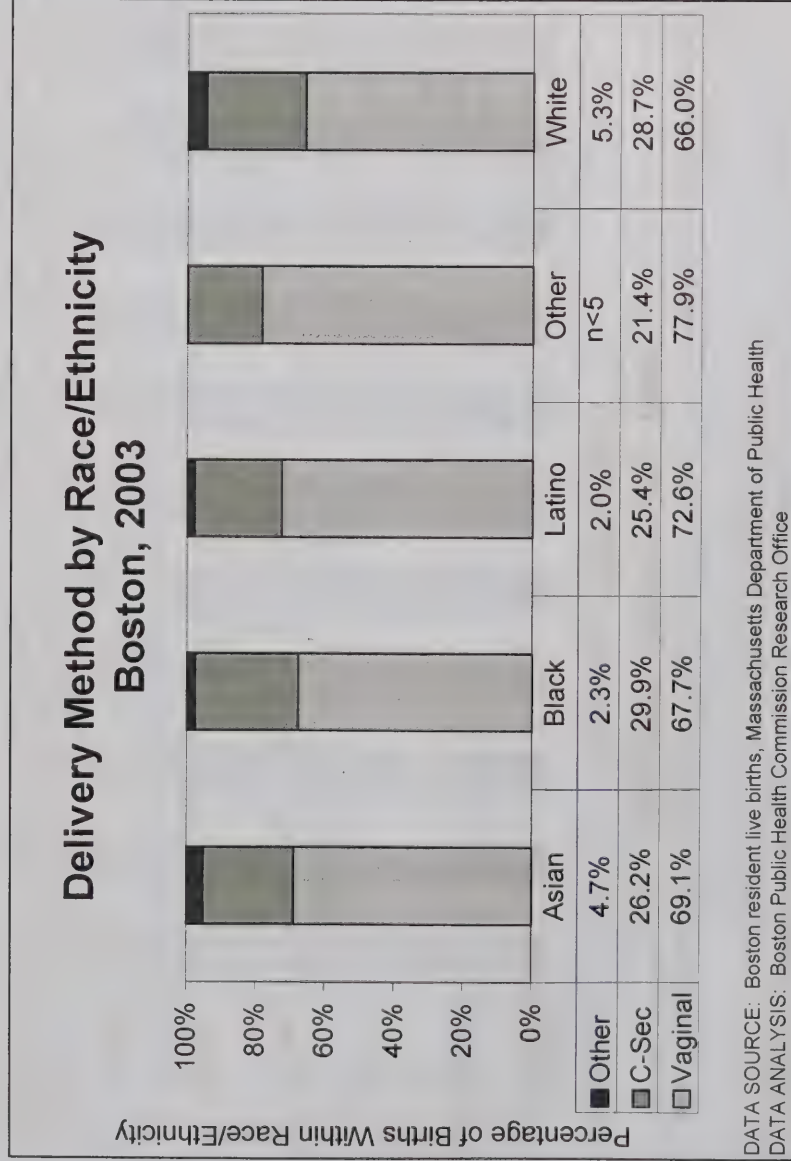
### Delivery Method



- Slightly more than two-thirds (n=5,340) of Boston births in 2003 were vaginal deliveries. This level has declined approximately 11.9% since its most recent high point in 1998.
- The use of Cesarean section, or surgical delivery, has risen about 49.2% since its most recent low point in 1997.
- Forceps or vacuum-assisted deliveries have become less common in Boston since the most recent high point for their use in 1996.

# MATERNAL CHARACTERISTICS

## Delivery Method

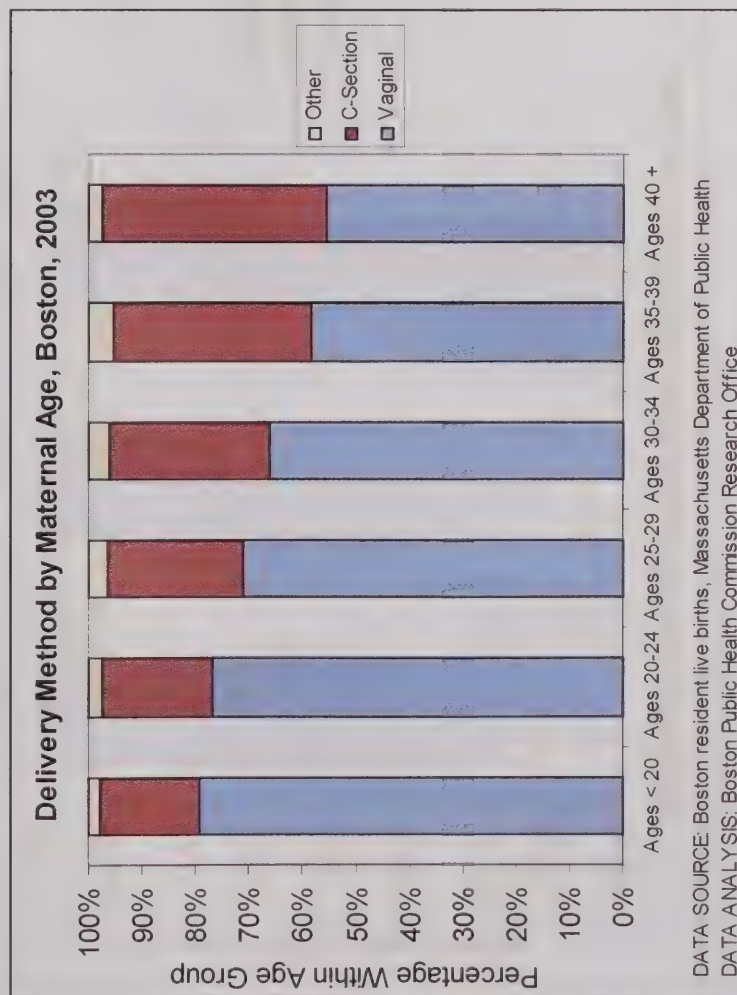


- In 2003, Cesarean section deliveries were more common among births to Black women than among births to women of other race/ethnicity groups.
- Vaginal deliveries were most common among births to Latinas than among births to women of other race/ethnicity groups.



## MATERNAL CHARACTERISTICS

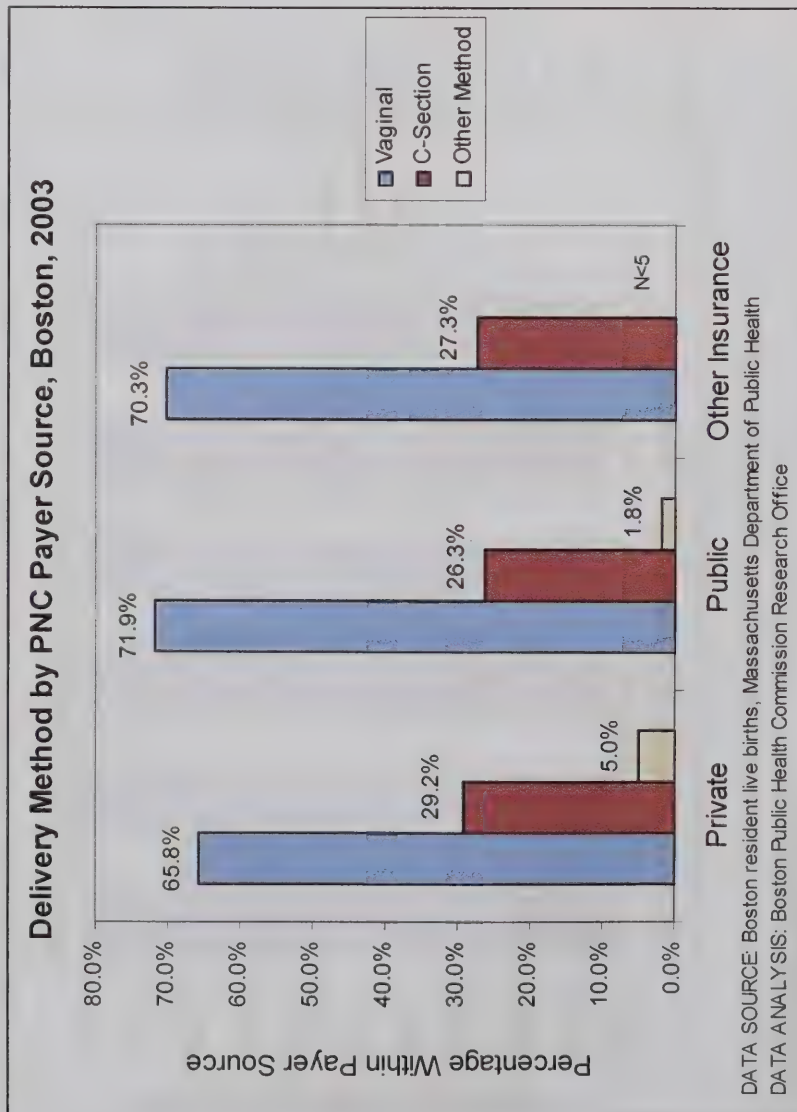
### *Delivery Method*



- Data from 2003 indicate that the mix of different delivery methods changed with increasing maternal age.
- Vaginal deliveries decreased as a percentage of total births as maternal age increased. Among women ages 20 and under, vaginal births made up 79.4% (n=456) of all births. In contrast, among women ages 40 and over, vaginal births comprised barely a majority (55.5%) (n=161) of all births.
- As vaginal births decreased with advancing maternal age, Cesarean births increased. Among women ages 20 and under, Cesarean births made up 18.3% (n=105) of all births, though among women ages 40 and older, Cesarean births made up 42.1% (n=122) of births.

# MATERNAL CHARACTERISTICS

## Delivery Method



- Delivery method in 2003 was associated with payer source for prenatal care.

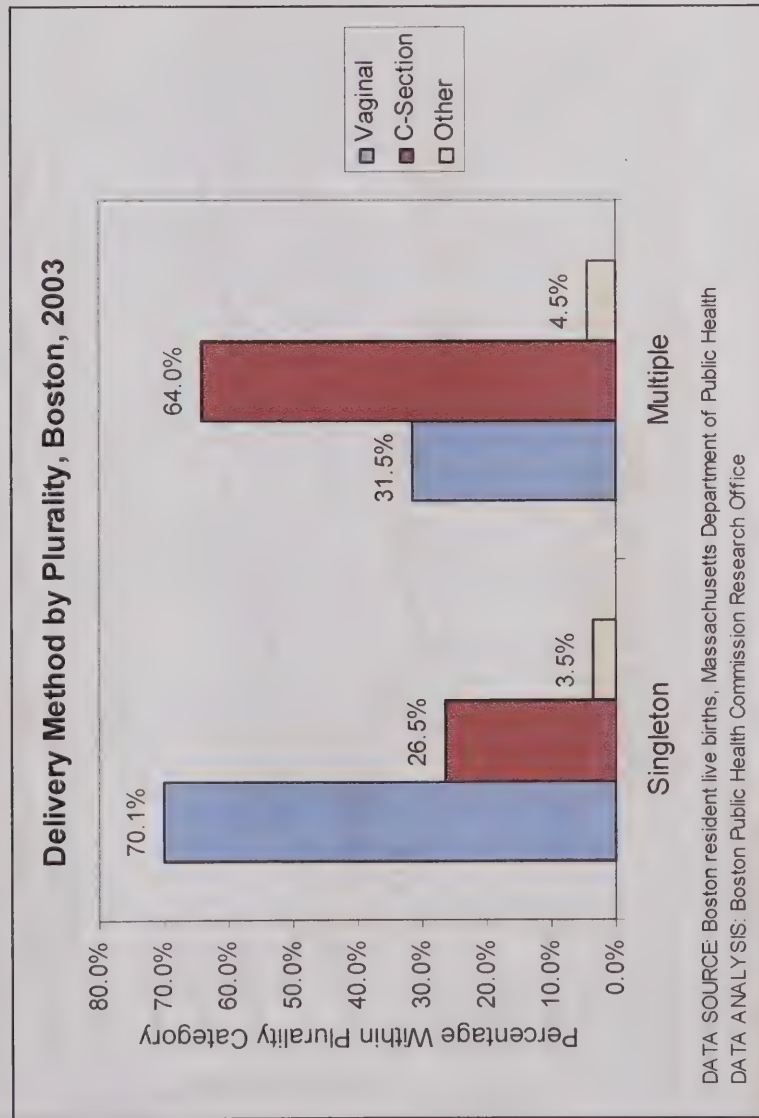
- Vaginal births made up the highest percentage of total births among births for which prenatal care was paid by public insurance.

- Vaginal births made up the smallest percentage of total births among births for which prenatal care was paid by private insurance such as Blue Cross/Blue Shield and health maintenance organizations.

- Cesarean births were most common among births for which prenatal care was paid by private sources, and were least common among births paid by public insurance.

# MATERNAL CHARACTERISTICS

## Delivery Method

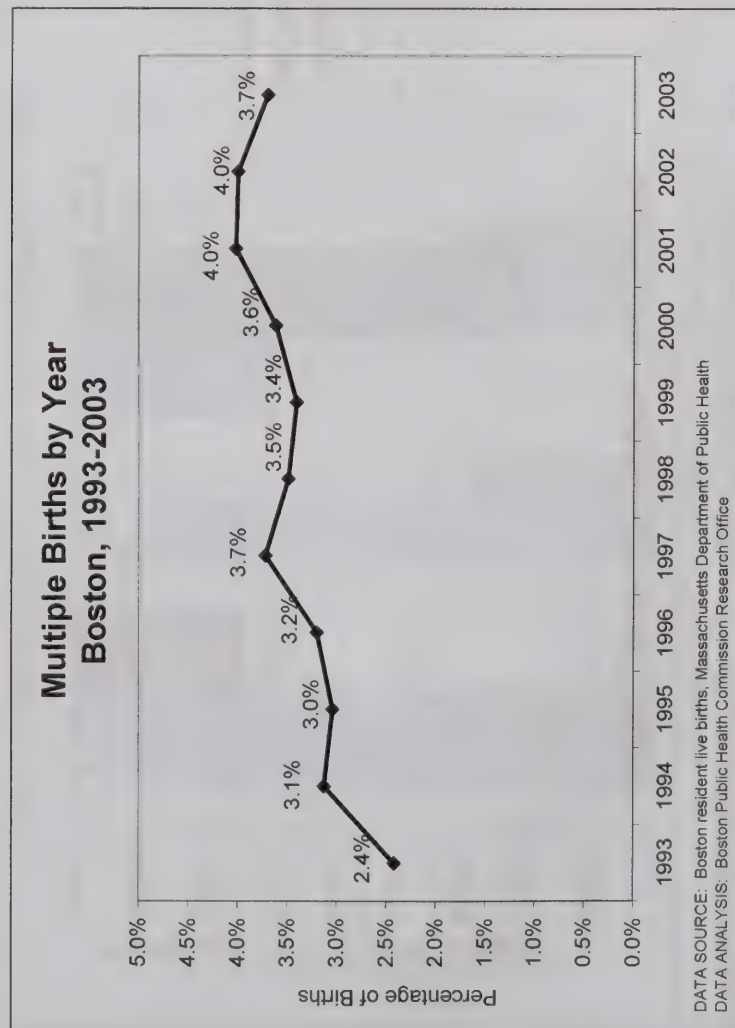


- Singleton births in 2003 were much more likely than plural births to be delivered vaginally.
- Almost three-quarters (70.1%) (n=5,250) of singleton births were delivered vaginally in 2003, compared with only 31.5% (n=90) of twins, triplets, or higher order births.



## INFANT CHARACTERISTICS

### *Multiple Births*



• Births that are twin, triplet, or higher-order multiple gestations have risen from 2.4% (n=212) of all Boston resident births in 1993 to 3.7% (n=289) in 2003. This difference is statistically significant.

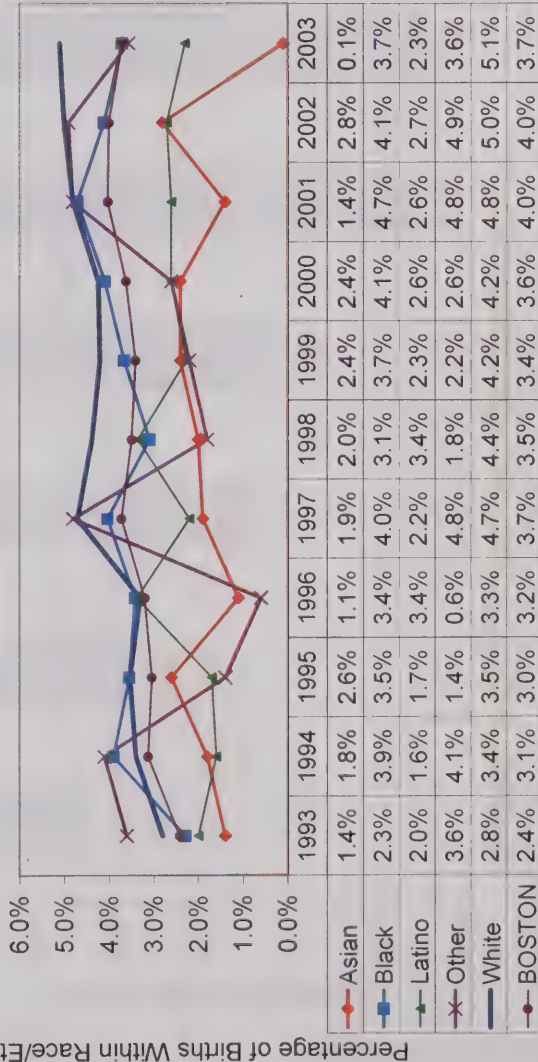
• The overall increase in multiple births over time is attributable to significant increases among Boston women 25 to 29 and 30 to 34 years of age (data not shown).

• The percentage of births that were multiple gestations increased 70.0% among Boston women less than 20 years of age and 73.9% among Boston women 30 to 34 years of age (data not shown). Multiple births as a percentage of all births rose among women of other age groups, except ages 20 to 24, between 1993 and 2003, but the differences were not statistically significant.

# INFANT CHARACTERISTICS

## Multiple Births

Multiple Births by Race/Ethnicity and Year  
Boston, 1993-2003

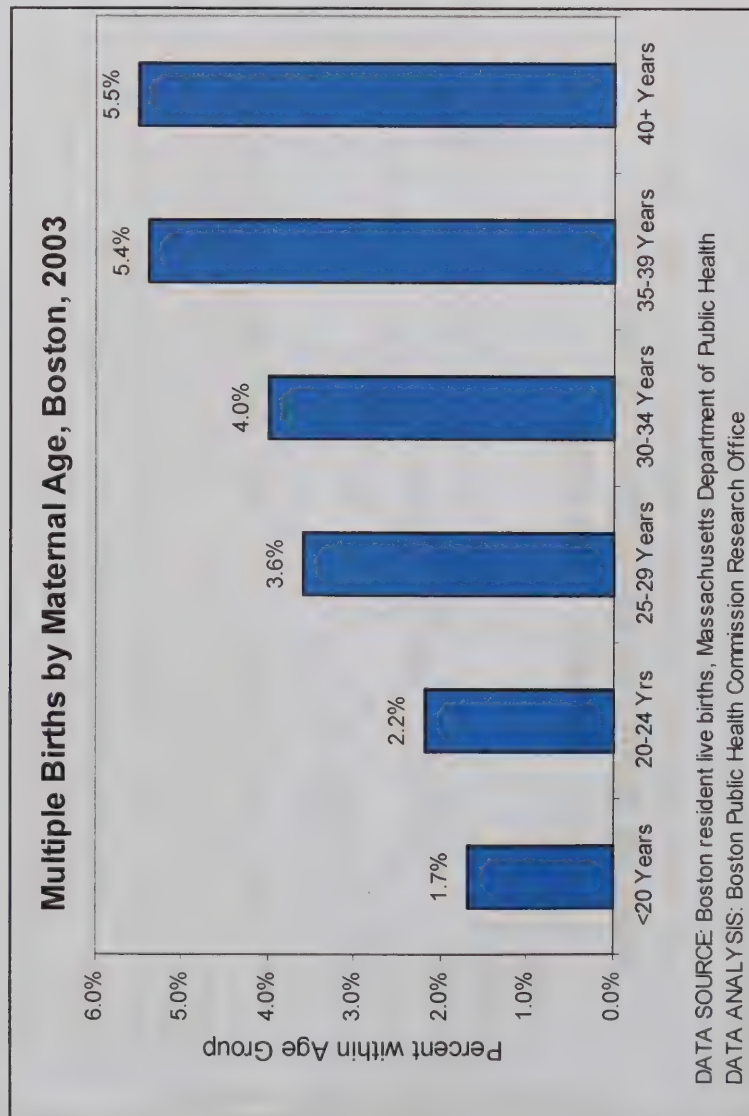


DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission Research Office

- Multiple births are more common among White than among other racial/ethnic groups.
- Multiple births have increased in recent years percentage of all births across most racial/ethnic groups.

## INFANT CHARACTERISTICS

### *Multiple Births*



- In 2003, multiple births were most common among women ages 35-39, about 5% of all births to women in this age group, and women age 40 and over, about 6% of all births.
- Multiple births were least common among births to women under the age of 20. Less than 2% (n=10) of births to teenagers were multiple births.

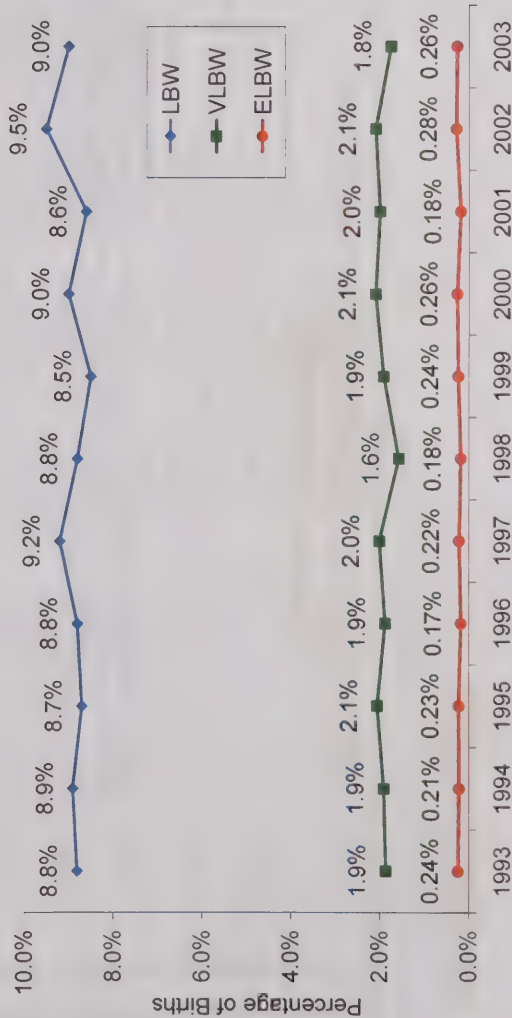


## INFANT CHARACTERISTICS

### Low Birthweight

Normal birthweight babies weigh at least 2,500 grams (5.5 pounds) at delivery. Infants who weigh less are considered to be of low birthweight (LBW). These infants may be preterm, meaning they were born too early, or they may be small for their gestational age or both. Within the LBW group are very low birthweight (VLBW) infants, who weigh less than 1,500g (3.3 pounds), and extremely low birthweight (ELBW) infants, who weigh less than 500g (1.1 lb). Two-thirds of Boston's infant deaths are among the two percent of infants born weighing less than 1,500 grams.

**Low Birthweight Categories by Year  
Boston, 1993-2003**

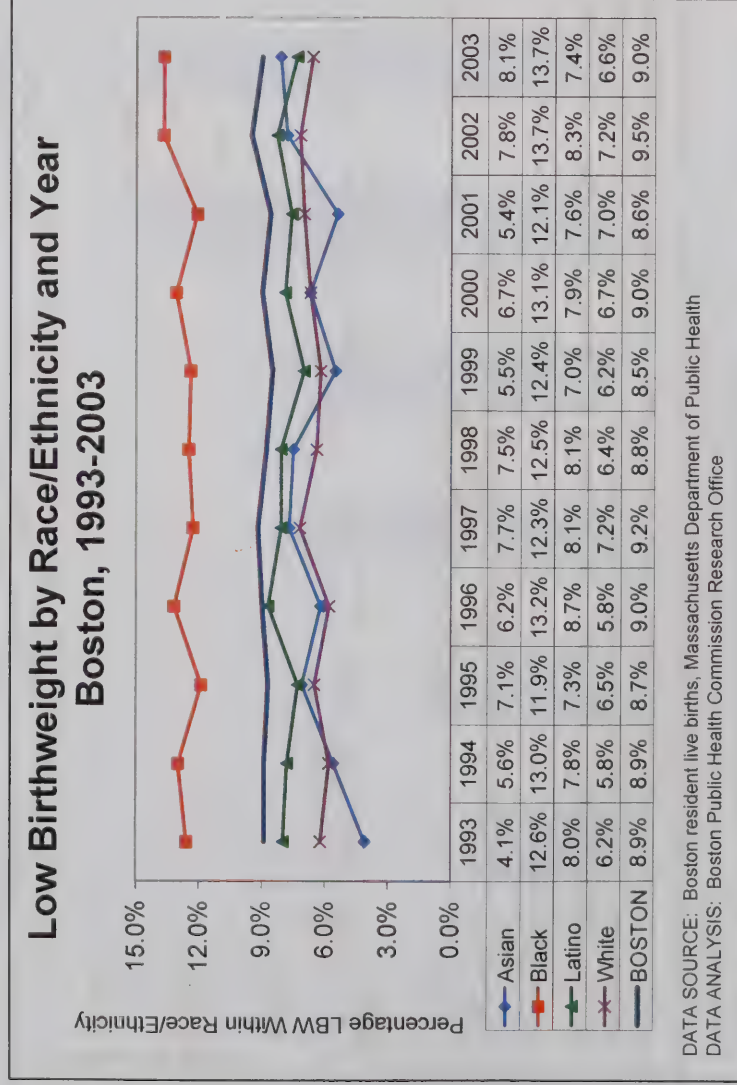


DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission Research Office

- Boston's rate of low birthweight decreased, but not significantly, between 2002 and 2003, from 9.5% to 9.0% in 2003.
- The rate of very low birthweight has fluctuated between 1.9% and 2.1% of all births for most years.
- Extremely low birthweight remains a very small percentage of Boston births. However, disparities exist in the occurrence of ELBW that strongly influence the differences seen in infant mortality rates across race/ethnicity groups.

# INFANT CHARACTERISTICS

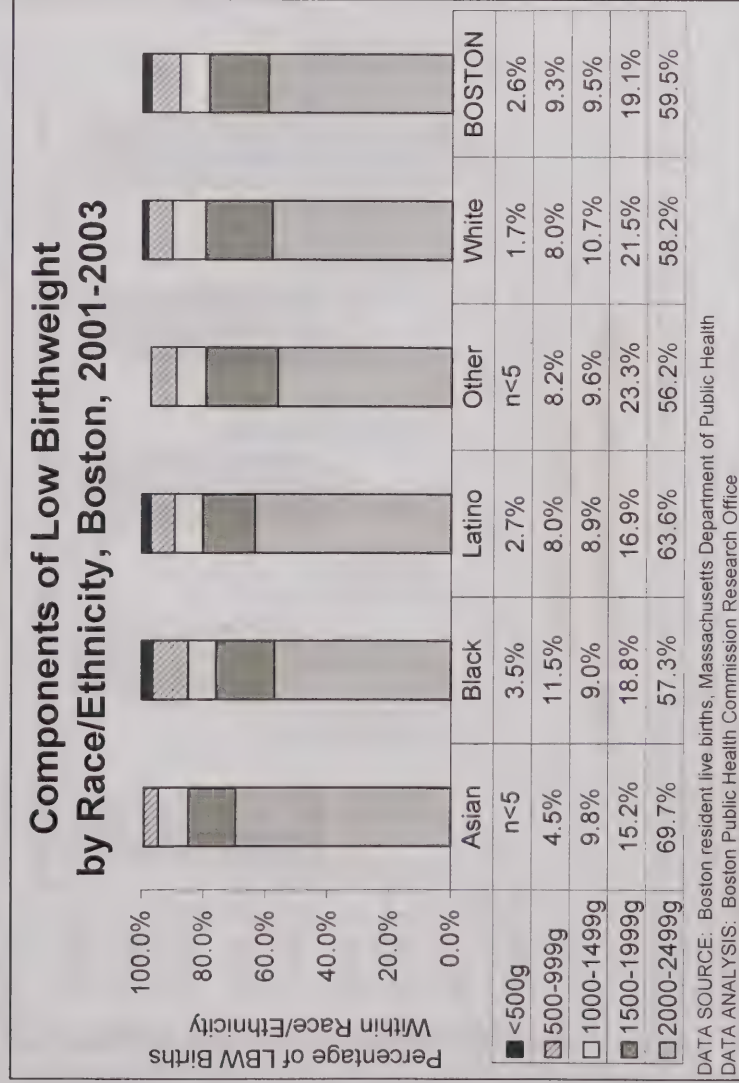
## Low Birthweight



- The persistently elevated LBW rate of Black Boston residents is one of the earliest of a broad range of health disparities affecting Black Bostonians across the lifespan. It reflects adverse circumstances, many of which are poorly understood, affecting women's capacity to maintain a healthy pregnancy long enough for a fetus to reach maturity.
- The LBW rate for Black infants in 2003 (13.7%) (n=309) was double that for White infants (6.6%) (n=192) and was higher than those of infants from other racial/ethnic groups. All of these differences were statistically significant.

# INFANT CHARACTERISTICS

## Low Birthweight

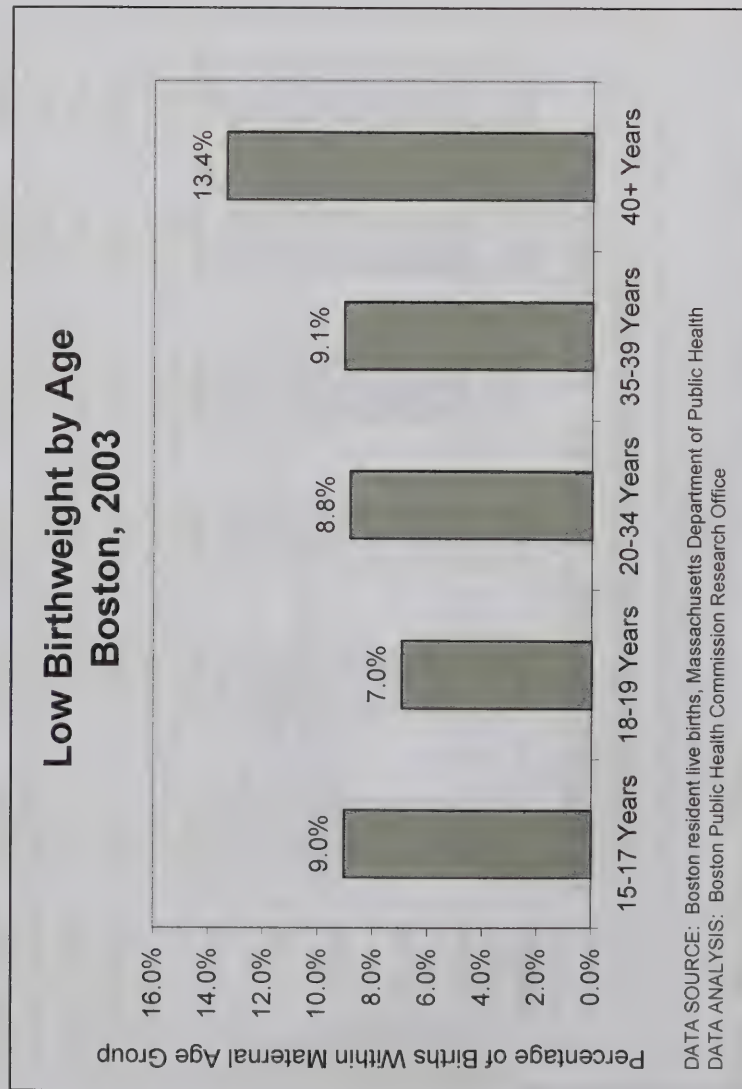


- In addition to a higher LBW rate, Black births have a higher percentage of their low birthweight births occurring at the very low end of the birthweight range, where mortality is high.
- Of Black LBW births during the period 2001-2003<sup>1</sup>, 24.0% (n=226) weighed less than 1,500g, compared with 15.2% (n=20) of Asian LBW births, 19.5% (n=81) of Latino LBW births, 20.3% (n=122) of White LBW births, and 20.5% (n=15) of Other LBW births.



## INFANT CHARACTERISTICS

### Low Birthweight

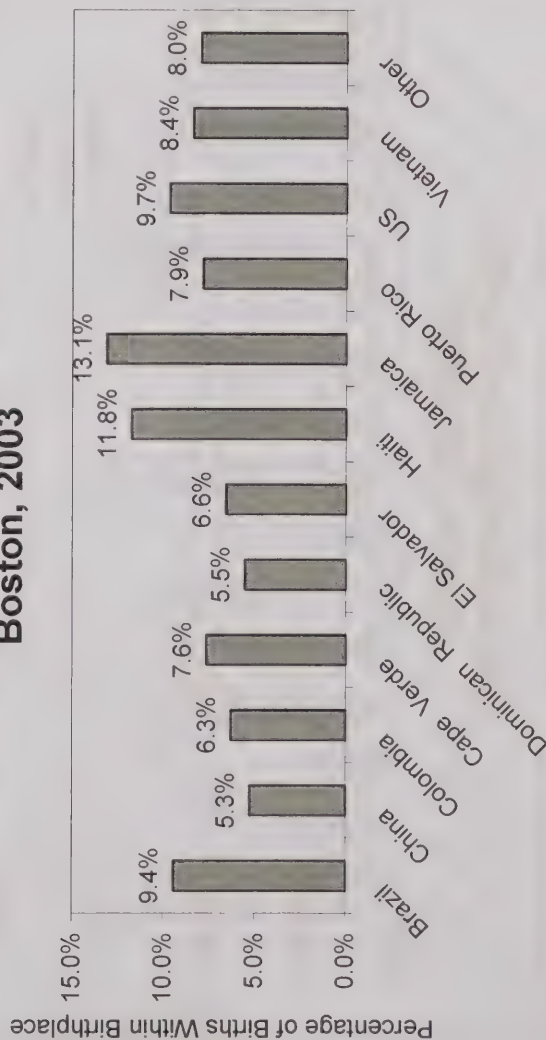


- In 2003, LBW rates in Boston were lowest in births to women between 18 and 34 years of age.
- The differences in low birthweight by maternal age were statistically significant for mothers ages 20-34 (n=499) compared with women ages 40 and over (n=39).

## INFANT CHARACTERISTICS

### Low Birthweight

**Low Birthweight by Maternal Birthplace  
Boston, 2003**



NOTE: "Other" includes some U.S. territories and all other countries not separately presented.

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health

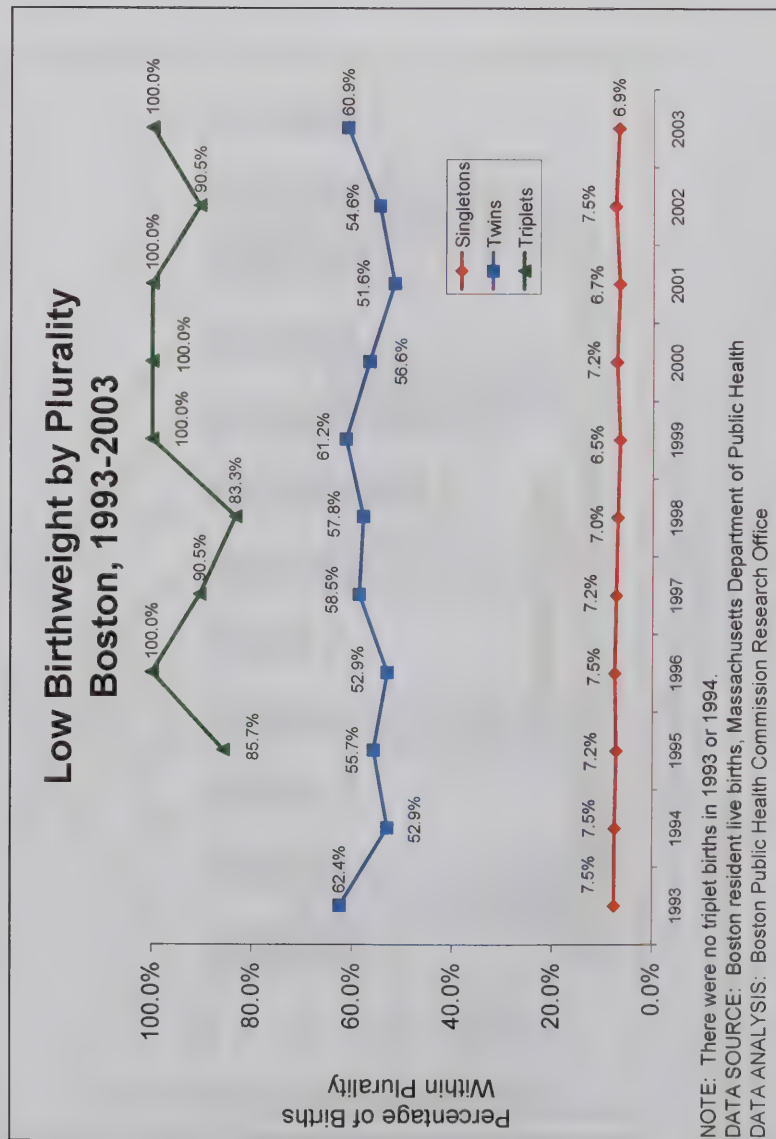
DATA ANALYSIS: Boston Public Health Commission Research Office

- Overall, low birthweight was more common (9.7%) (n=406) among infants of US-born women than among infants of women born outside of the United States (8.1%) (n=291 (data not shown)). This difference was statistically significant. For this analysis, US-born is defined as including all 50 states and the District of Columbia.

- Low birthweight was most common among US-born Black births (14.8%) (n=194), followed by births to Jamaican women (13.1%) (n=18), and births to Haitian women (11.8%) (n=48).

# INFANT CHARACTERISTICS

## Low Birthweight



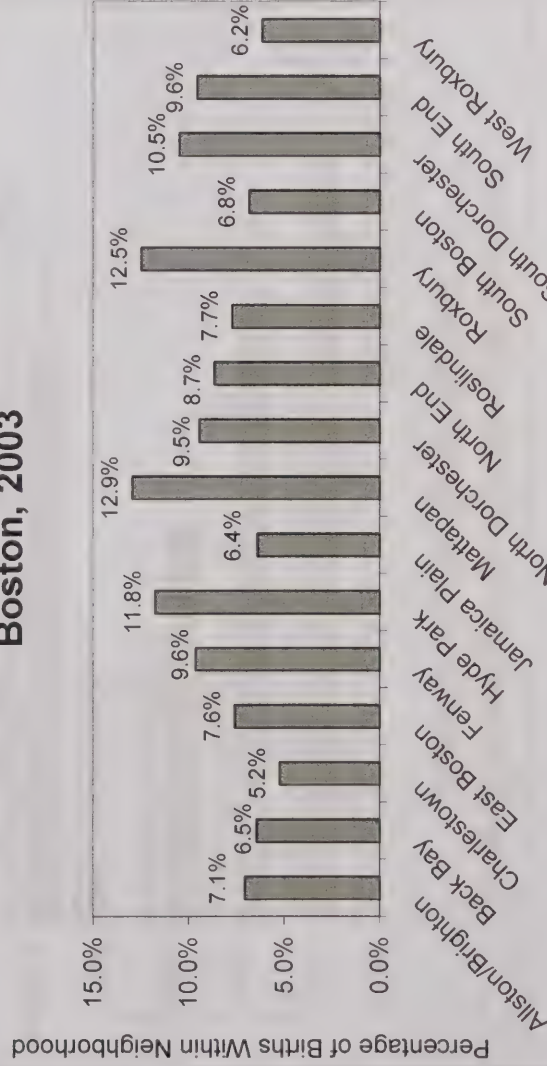
- Plurality, or the number of infants born of one pregnancy, strongly influences the occurrence of low birthweight.
- In Boston, the LBW percentage for singleton births (6.5% - 7.5%) has been far lower than those for twins (51.6% - 62.4%) and triplets (83.3% - 100.0%) every year from 1993 through 2003.
- The one-year change in percentage of LBW between 2002 and 2003 was not statistically significant for any of the categories shown.



# INFANT CHARACTERISTICS

## Low Birthweight

Low Birthweight by Neighborhood  
Boston, 2003



NOTE: Back Bay includes Beacon Hill and the West End

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health

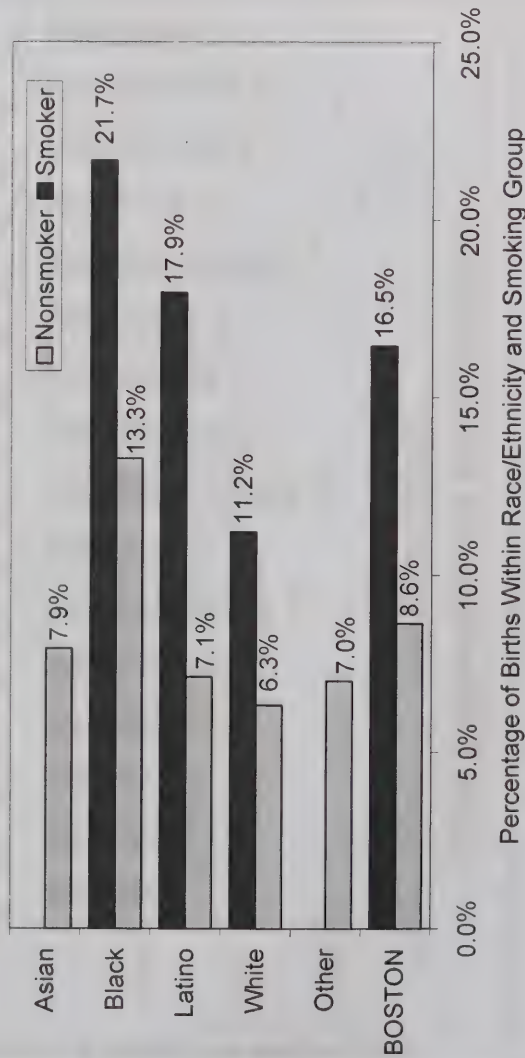
DATA ANALYSIS: Boston Public Health Commission Research Office

- Boston's highest rates of LBW in 2003 were for Mattapan, Roxbury, Hyde Park, and South Dorchester.
- The city's lowest rates were for Charlestown, West Roxbury, Jamaica Plain, and the Back Bay.

# INFANT CHARACTERISTICS

## *Low Birthweight*

**Low Birthweight by Smoking Status and Race/Ethnicity, Boston, 2003**



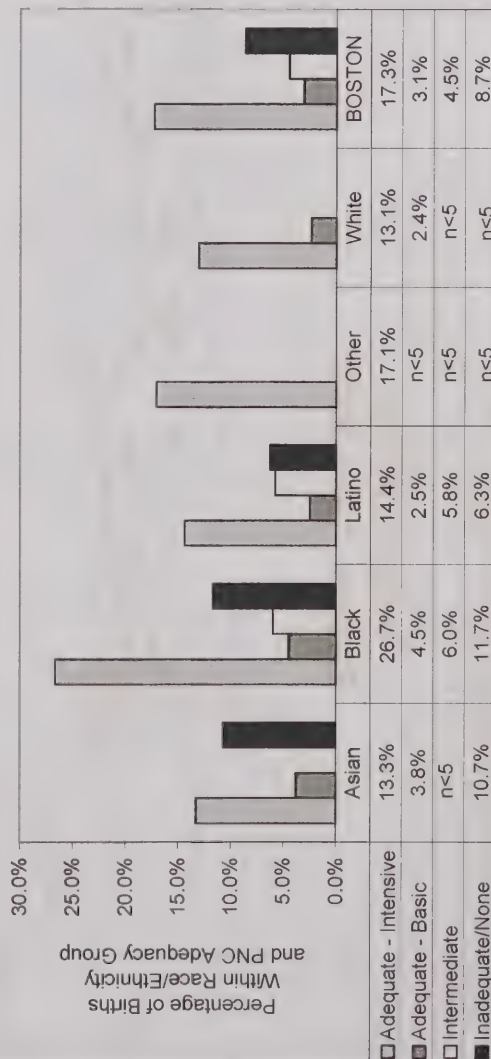
NOTE: LBW for Asian and Other smokers is not shown because N<5 in each group.  
 DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
 DATA ANALYSIS: Boston Public Health Commission Research Office

- Cigarette smoking has been associated with a higher risk of prematurity, measured in terms of low birthweight, preterm birth, and/or intrauterine growth retardation.
- The higher percentage of LBW births to smokers relative to non-smokers was statistically significant for Boston overall.
- The data also illustrate a large disparity in LBW by race/ethnicity. The percentage of LBW births to Black non-smokers was higher than that to White smokers.

# INFANT CHARACTERISTICS

## Low Birthweight

Low Birthweight by Adequacy of Prenatal Care and Race/Ethnicity, Boston, 2003



NOTE: LBW percentage not shown where N<5. PNC adequacy assessed by the Kotelchuck Index (APNCU Index)  
 DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
 DATA ANALYSIS: Boston Public Health Commission Research Office

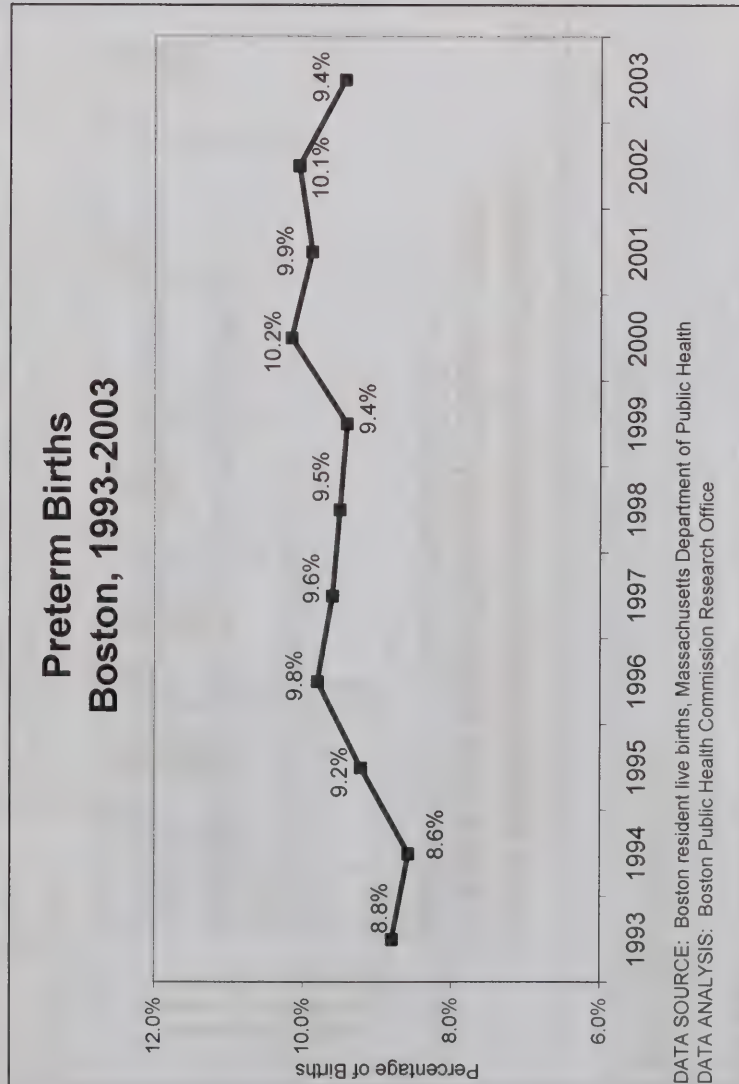
- For Boston overall in 2003 and for all race/ethnicity groups, the percentage of low birthweight was highest for births accompanied by **Adequate-Intensive** prenatal care. Births receiving more than routine prenatal care typically involve complicated or high-risk pregnancies requiring close medical management.
- The lowest LBW percentages for every race/ethnicity group were in the **Adequate-Basic** PNC group. LBW ranged from 2.4% of births to White mothers to 4.5% of births to Black mothers at this care level.
- For all race/ethnicity groups except Other (for whom small numbers preclude the calculation of LBW percentages for most levels of care), percentages of LBW are higher at the **Adequate-Intensive** and the **Inadequate/None** levels of prenatal care. In each of these categories, percentages were highest for births to Black mothers.



## INFANT CHARACTERISTICS

### *Preterm Birth*

A preterm birth (PTB) is one that occurs at less than 37 completed weeks' gestation. Infants born too early are at substantially increased risk of illness and death, and the earlier they are born, the higher their risk. Preterm birth and low birthweight are highly correlated, with 68.1% of LBW births in 2003 also being preterm, and 64.4% of preterm births also being LBW.

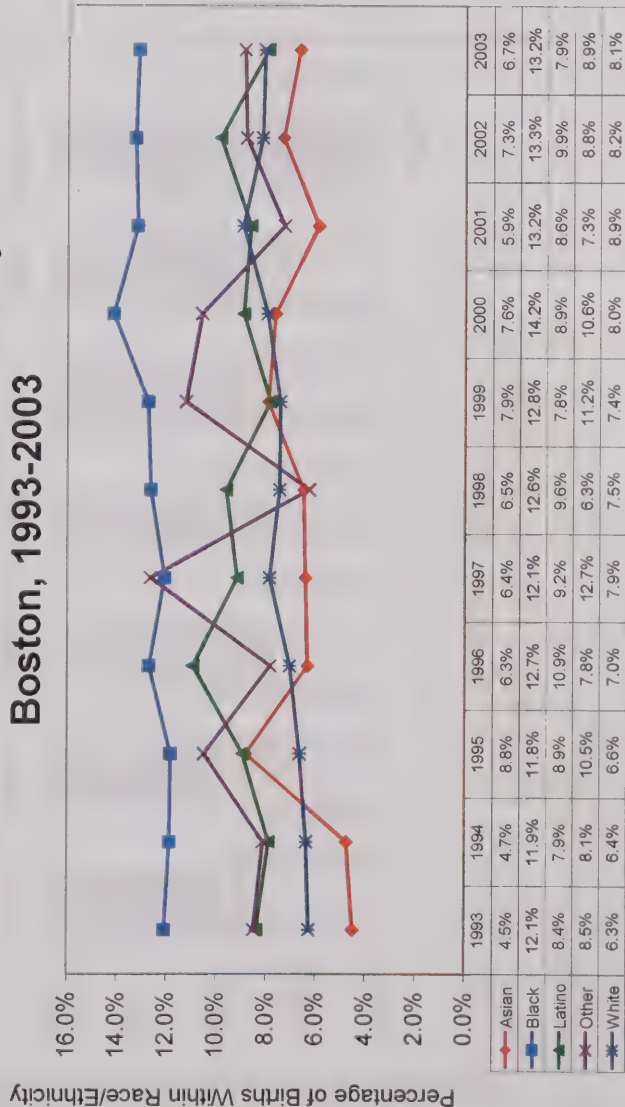


- Preterm birth has ranged between 8.6% and 10.2% of Boston births for the past decade.
- The percentage of preterm birth for 2003 (9.4%) (n=735) was not significantly different from that for 1993 (8.8%) (n=767).

# INFANT CHARACTERISTICS

## Preterm Birth

Preterm Births by Race/Ethnicity  
Boston, 1993-2003

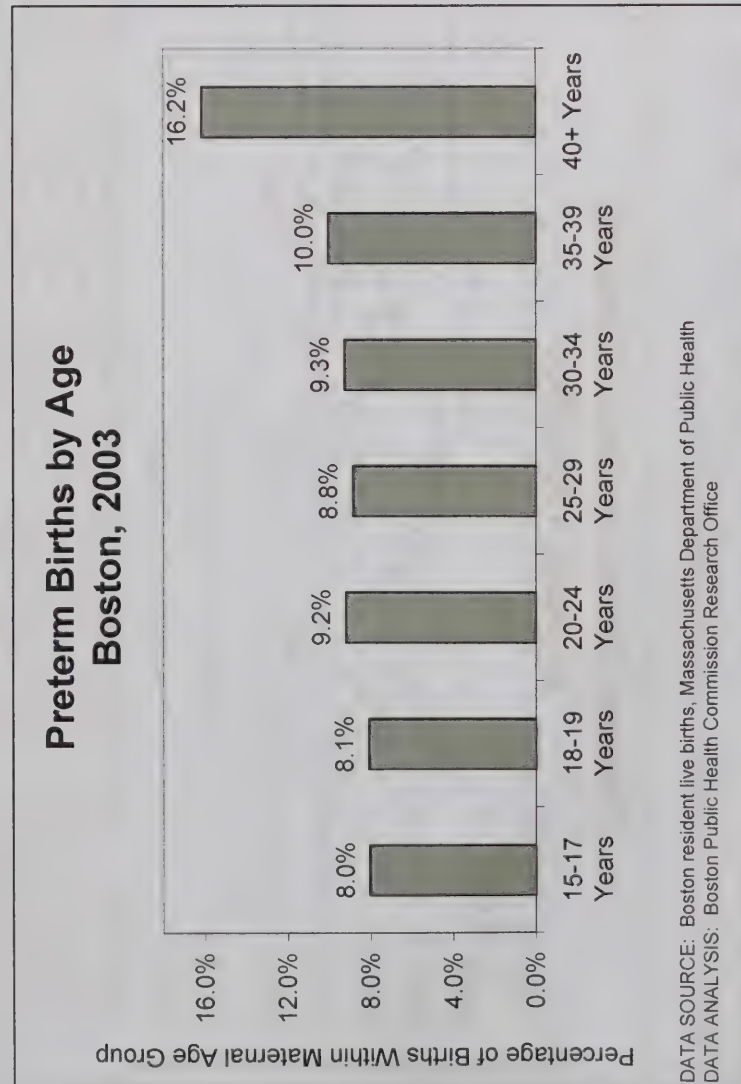


DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission Research Office

- As with low birthweight, preterm births are more common for Black Boston women. For every year between 1993 and 2003, except 1997, the percentage of preterm birth was highest for Blacks.
- During the period 1993-2003, Asian, Latino, and White infants were less likely to be born preterm than were Black infants, and these differences were statistically significant.

## INFANT CHARACTERISTICS

### Preterm Birth

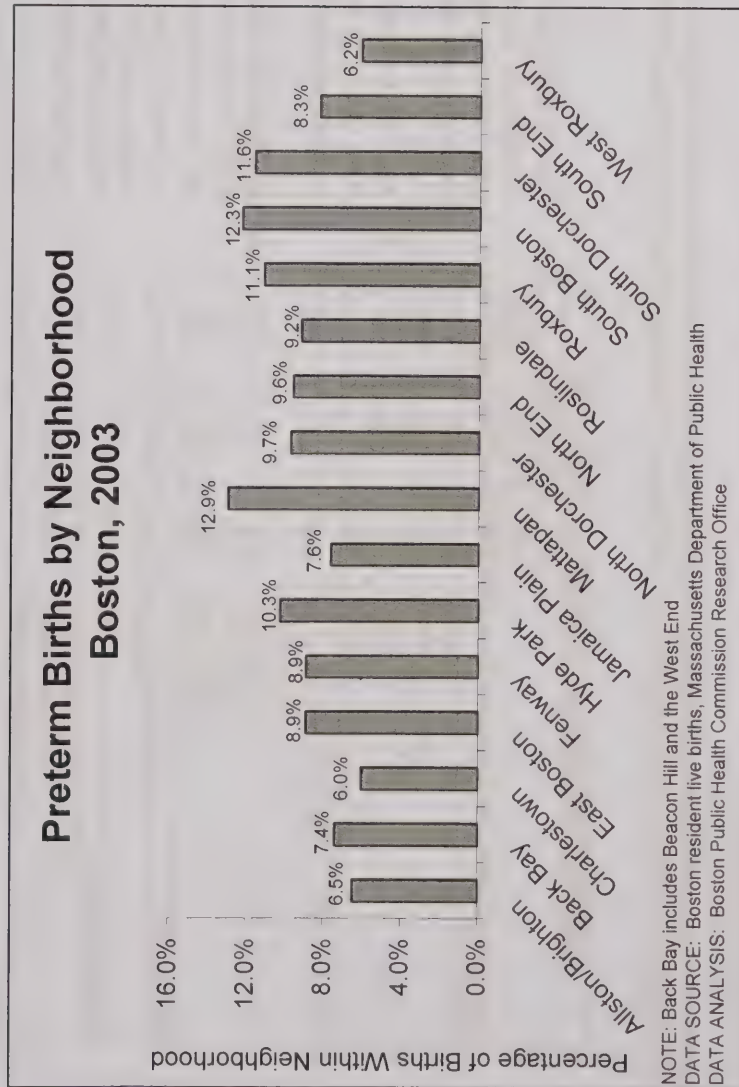


- Overall, about one in every ten Boston births in 2003 was preterm (9.4%) (n=735) (Data not shown).
- Preterm birth (PTB) was least common among births to teens and most common among births to women ages 40 and over. PTB among births to women ages 40 and over was double the rate among births to teens.



# INFANT CHARACTERISTICS

## Preterm Birth



- Boston's neighborhood with the highest percentage of preterm birth in 2003 was Mattapan (12.9%) (n=40), followed by South Boston (12.3%) (n=52) and South Dorchester (11.6%) (n=82).

## INFANT CHARACTERISTICS

### Preterm Birth

Logistic regression was used to examine the relationship between preterm birth and several characteristics reported on the birth certificate. An advantage of this statistical technique is that it permits the influence of one characteristic to be estimated while that of all others under consideration is held constant.

Adjusted Odds Ratios for Preterm Birth, Boston, 2003				
	Adjusted Odds Ratio	Preterm Birth		Upper 95% CI
		Lower 95% CI	Upper 95% CI	
Race/Ethnicity				
Asian	1.22	0.85	1.76	
Black	2.10	1.67	2.64	
Latino	1.28	0.97	1.68	
Other	1.35	0.84	2.18	
White*	1.00			
Age				
<20 Years	0.75	0.51	1.11	
20-24 Years*	1.00			
25-29 Years	1.06	0.81	1.38	
30-34 Years	1.35	1.03	1.76	
35-39 Years	1.39	1.02	1.88	
40 or Older	2.59	1.72	3.88	
Marital Status				
Married*	1.00			
Single	1.38	1.12	1.69	
Educational Attainment				
Less Than High School Diploma	0.82	0.62	1.08	
HS Graduate/GED*	1.00	0.80	1.19	
At Least Some College	0.81	0.66	0.99	
Plurality				
Singleton*	1.00			
Twins or Higher	26.32	20.06	34.53	
Smoking During Pregnancy				
Smoker	1.63	1.13	2.35	
Non-Smoker*	1.00			
*Reference group.				
NOTE: Insurance status and maternal birthplace were not significant predictors.				
DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health				
DATA ANALYSIS: Boston Public Health Commission Research Office				

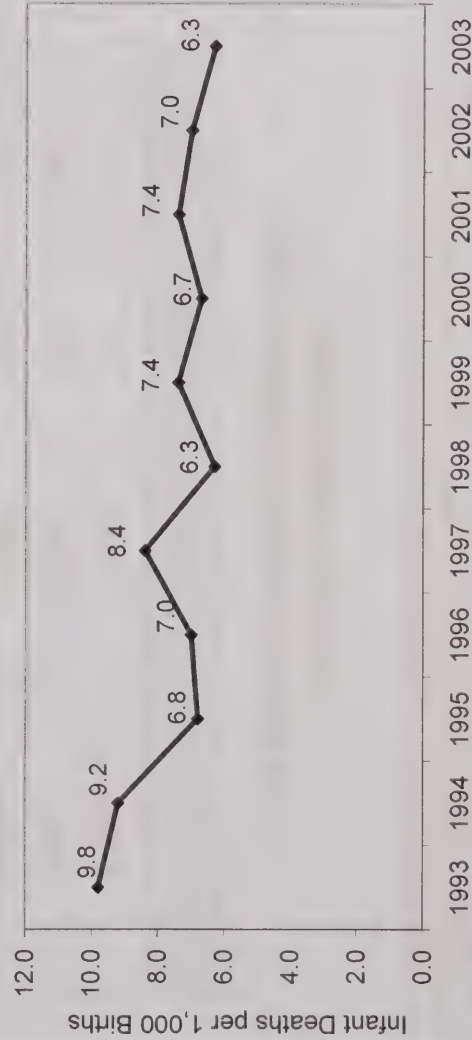
- The strongest association with preterm birth in this analysis was, not surprisingly, the number of infants in the pregnancy. Other factors being equal, twins or other multiple births were about 26.6 times as likely as singletons to be delivered prematurely.
- Black births were about twice as likely, and Latino births were about 28% more likely, to be preterm than were White births. Both of these differences were statistically significant.
- Maternal age was also significantly related to the likelihood of preterm birth. Relative to births to women ages 20-24, the odds of premature delivery for infants of women ages 40 and over increased 159%, the odds for infants to women ages 35-39 increased 39%, the odds for infants to women ages 30-34 increased 36%, the odds for infants to women ages 25-29 increased 35%, and the odds for infants to women ages 25-29 increased 6%. All these differences were statistically significant, except for ages 25-29.
- Births to unmarried mothers were 38% more likely to be premature, and to women with at least some college, 81% as likely to be premature.

## INFANT MORTALITY

### Trend

Infant mortality is defined as the death of a liveborn baby before its first birthday. In Boston, the most frequent causes of infant death are conditions related to prematurity and congenital anomalies. Despite yearly fluctuations because of its relative infrequency, infant mortality is a useful indicator of the health not only of babies, but also of women of childbearing age and the surrounding community.

**Infant Mortality Rate by Year  
Boston, 1993-2003**



DATA SOURCE: Boston resident deaths and live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission Research Office

- In 2003, there were 49 deaths of Boston infants, yielding an infant mortality rate (IMR) of 6.3 infant deaths per thousand live births. The one-year decrease from 7.0 per thousand in 2002 was not statistically significant.
- Infant mortality also decreased between 1993 and 2003, but this trend was not statistically significant.



## INFANT MORTALITY

### Disparities

Differences across population groups in the occurrence of infant death are important indicators of disparities in women's health, health care access, and the general health of communities. Perhaps more than any other single health measure, infant mortality is considered throughout the world to reflect the impact of economic burdens, racism, and social stressors on individuals and communities.

### Infant Mortality Rates by Race/Ethnicity, Boston, 2003

	Births	Deaths	IMR
Asian	615	0	--*
Black	2,256	32	14.2
Latino	1,742	7	4.0
White	2,907	9	3.1
Other/Unknown	297	1	--*
<b>TOTAL</b>	<b>7,817</b>	<b>49</b>	<b>6.3</b>

Infant mortality rate: deaths per 1,000 live births

\*Rates not calculated when the number of deaths is <5.

DATA SOURCE: Boston resident deaths and live births, Massachusetts Department of Public Health

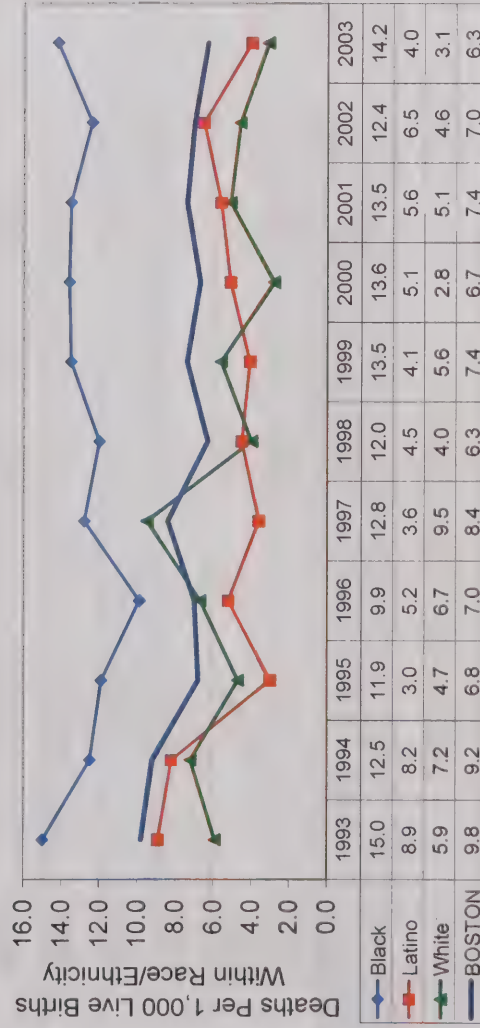
DATA ANALYSIS: Boston Public Health Commission Research Office

- The 2003 IMR for Boston's Black infants was 14.2 deaths per thousand live births, significantly higher than the IMR for White infants.
- Boston's Asian population, with 8.0% of the city's births, had no infant deaths in 2003.
- Black residents, with 28.9% of births, had 65.3% of all infant deaths.
- The Latino percentage of Boston births in 2003 was 22.3%, while its percentage of infant deaths was 14.3%.
- Whites had 37.2% of Boston's births in 2003, but only 18.4% of its infant deaths.

# INFANT MORTALITY

## Disparities

Infant Mortality Rates by Race/Ethnicity and Year, Boston, 1993-2003



NOTE: Rates for Asians and Others are not presented because each group had <5 deaths per year for several of these years.  
 DATA SOURCE: Boston resident deaths and live births, Massachusetts Department of Public Health  
 DATA ANALYSIS: Boston Public Health Commission Research Office

- Although the 2003 IMRs for Black and White infants are lower than they were in 1993, neither change over time represented a statistically significant decline. Similarly, the change in the Latino IMR between 1993 and 2003 was not statistically significant.
- The relationship between Black infant mortality and that of other groups was consistent over time: at no point did other IMRs exceed those of Black infants.

## INFANT MORTALITY

### *Disparities*

#### Black and White Infant Mortality Rates Boston, 1993-2003

	Black	White	Ratio
1993	15.0	5.9	2.5
1994	12.5	7.2	1.7
1995	11.9	4.7	2.5
1996	9.9	6.7	1.5
1997	12.8	9.5	1.3
1998	12.0	4.0	3.0
1999	13.5	5.6	2.4
2000	13.6	2.8	4.9
2001	13.5	5.1	2.6
2002	12.4	4.6	2.7
2003	14.2	3.1	4.6

DATA SOURCE: Boston resident deaths and live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission Research Office

- The disparity between the infant mortality rates of Black and White Boston residents can be expressed as a ratio. Over time, this ratio has consistently shown a large excess in Black infant deaths relative to those of Whites.

- The smallest disparity between 1993 and 2003 was in 1997, when the value of 1.3 indicated a 30% excess in the Black IMR. The largest disparity occurred in 2000, when there were 4.9 Black infant deaths for every White infant death.



## INFANT MORTALITY

### *Disparities*

In Boston, large differences across racial/ethnic groups exist in the occurrence of preterm birth and low birthweight. These differences have large implications for infants' chances of survival.

#### Cumulative Birthweight Distribution By Race/Ethnicity, Boston, 1998-2003

	<500g	<750g	<1,000g	<1,500g	<2,000g	<2,500g	2,500g+
Asian	0.08%	0.14%	0.44%	0.97%	2.37%	6.84%	93.16%
Black	0.47%	1.39%	2.03%	3.25%	5.72%	12.92%	87.08%
Latino	0.18%	0.48%	0.80%	1.48%	3.05%	7.72%	92.28%
Other	0.11%	0.27%	0.70%	1.57%	3.46%	8.06%	91.94%
White	0.11%	0.36%	0.64%	1.22%	2.65%	6.68%	93.32%

- Mortality is high in very small births: about ninety percent of infants born weighing less than 500 grams (1.1 pounds) die, compared with fewer than two in a thousand babies of normal birthweight (2,500g, or 5.5 pounds, or more).
- Extremely premature births are far more common among Black Boston residents than among other race/ethnicity groups, and this fact accounts for much of the excess mortality of Black infants.

DATA SOURCE: Boston resident live births, Massachusetts Department of Public Health  
DATA ANALYSIS: Boston Public Health Commission Research Office

## APPENDIX

## Healthy People 2010

Healthy People 2010 Objectives  
Selected Maternal and Infant Health Indicators

OBJECTIVE		HP 2010 TARGET
<b>Prenatal Care</b>		
Care beginning in first trimester		90% of births
<b>Risk Factors</b>		
Low Birthweight (LBW)		no more than 5% of births
by Race/Ethnicity:		
White, non-Hispanic		no more than 6.5% of births
Black, non-Hispanic		no more than 13.1% of births
Hispanic		no more than 6.4% of births
Asian		no more than 7.2% of births
Very Low Birthweight (VLBW)		no more than 0.9% of births
Preterm*		no more than 7.6% of births
by Race/Ethnicity:		
White, non-Hispanic		no more than 9.9% of births
Black, non-Hispanic		no more than 17.6% of births
Hispanic		no more than 11.2% of births
Asian		no more than 10.2% of births
<b>Infant Deaths</b>		
Infant Mortality Rate		no more than 4.5 deaths per 1,000 births
by Race/Ethnicity:		
White, non-Hispanic		no more than 6.0 deaths per 1,000 births
Black, non-Hispanic		no more than 13.7 deaths per 1,000 births
Hispanic		no more than 6.0 deaths per 1,000 births
Asian		no more than 5.0 deaths per 1,000 births
Neonatal Mortality Rate		no more than 2.9 deaths per 1,000 births
by Race/Ethnicity:		
White, non-Hispanic		no more than 3.9 deaths per 1,000 births
Black, non-Hispanic		no more than 9.4 deaths per 1,000 births
Hispanic		no more than 4.0 deaths per 1,000 births
Asian		no more than 3.2 deaths per 1,000 births
Postneonatal Mortality Rate		no more than 1.5 deaths per 1,000 births
by Race/Ethnicity:		
White, non-Hispanic		no more than 2.1 deaths per 1,000 births
Black, non-Hispanic		no more than 4.5 deaths per 1,000 births
Hispanic		no more than 2.0 deaths per 1,000 births
Asian		no more than 1.8 deaths per 1,000 births

\*Born before completion of 37 weeks gestation

Note: Asian includes Pacific Islanders.

DATA SOURCE: Available at <http://wonder.cdc.gov/DATA2010/OD16.HTM>. Accessed November 1, 2002.

## APPENDIX

### Technical Notes

This section provides additional information about the terms, concepts, and sources used in *Boston Natality 2005: A Review of 2003 Birth Data*. A number of these subjects are also covered in the glossary. Readers may call the Boston Public Health Commission's Research Office at (617) 534-4757 for more information with questions about the report.

#### Adolescence

The Boston Public Health Commission does not include 18 and 19 year-old women in the count of Boston adolescent births and the city's adolescent birth rate. The childbearing patterns of these young adults are distinctive from those of adolescents in their early to mid-teens and so are reported separately.

#### Rates

Two types of rates have been included in *Boston Natality 2005: A Review of 2003 Birth Data*. They are *Age-Specific Rates (ASR)* and *Infant Mortality Rates (IMRs)*.

*Age-Specific Rates (ASRs)* take into account the size and age distribution of the population. They enable the reader to compare different groups without being concerned that differences in health status of those groups are due to differences in the size of the groups or in distribution of ages. An ASR is calculated by dividing the number of events among people in an age group by the number of people in that age group. ASRs for birth-related rates are calculated for every 1,000 women in any age group. In this report, race/ethnicity specific ASRs are also presented.

*Infant Mortality Rates (IMRs)* are used as a measure of infant deaths within a population. However, unlike mortality rates for adults or children one year of age and over, which are usually calculated as the number of events per 100,000 persons in the population, IMRs are calculated on the basis of every 1,000 live births.



## APPENDIX

### *Technical Notes*

#### **Statistical Significance**

An array of statistical tools are available to determine whether findings, typically differences observed between groups or within a group over a period of time, are large enough that they are not likely to have been due to chance. Essentially, statistical significance testing provides an assessment of how reasonable it would be to conclude that an observed difference is real. It is not capable of overcoming other issues such as non-comparable samples or too few cases in a sample, but is a valuable guide to the interpretation of rates, proportions, and similar measures. In this report, statistically significant rates and percents are reported based on whether the particular finding could be expected to occur in fewer than 5 out of 100 similar circumstances, abbreviated as  $p < .05$ .

Statistical significance is only one measure of significance. There may be findings that have other important relevance clinically or for public health programs, regardless of statistical significance. An absence of statistical significance should not be used to imply an absence of other significance.

#### **Logistic Regression**

Logistic regression is a statistical technique that assesses the impact of several qualities of a population group at the same time. The goal of logistic regression analysis is to design a mathematical model that can predict a particular outcome such as low birthweight or the adequacy of prenatal care, known as the dependent variable. In order to do so, this model must take into account factors that may affect the possibility that this outcome may occur. These factors are called independent variables and can include biological, environmental, or social elements. A successful logistic regression model will include any relevant factors and be able to predict which members of the population are likely to have the outcome of interest.

To indicate how greatly a factor predicts the outcome, a number, called the coefficient, is calculated to represent the relative strength of that relationship. A logistic regression equation integrates relationships like these into a model that includes many variables and their coefficients.

#### **Time Periods and Small Numbers of Events**

This report contains data drawn from the period 1993 through 2003. In general, Boston-specific data are presented for the eleven-year time span of 1993 through 2003 either by year or for 2003 only.

## APPENDIX

### *Technical Notes*

Determination of the time period to be used depends largely on the availability and adequacy of the data. In analyzing subgroups within the Boston population there must be a sufficient number of events, such as deaths or births, within the time period to provide reliable rates. Though what is defined as a "small" number can vary, the BPHC Research Office adheres to the widespread practice of not calculating rates for fewer than five deaths, births, or other events.

### **Population**

Health status reports often use population statistics for analyzing health data. These population statistics may be drawn from two sources. The first is the census of the population taken every ten years by the federal government, a literal count of all people living in the United States. The second is estimates of the population made by the US Census Bureau or some other source in the intervening years.

Each source has its own advantages, and there are distinct reasons for choosing each one. The census provides the best available actual count of the population. Another important strength of the census is that it presents data to the level of small areas called census tracts, each of which has only a few thousand residents. Census tracts can be combined to produce neighborhood-level analyses.

However, while the 1990 census was the best estimate of the population for the early 1990s, with each passing year it becomes more remote from the population it was intended to represent. Changes in the population in the years following the census cannot be taken into account when using old census data, so this report utilizes population estimates. In this report the 2000 census population for Boston as well as population estimates for the years between the censuses have been used.

Population projections, or estimates, of the population, are developed by the Census Bureau and other institutions using sophisticated statistical methods. The results are designed to take into account in- and out-migration and other changes occurring in the population between census years. And yet, for the purposes of this report, estimates of population changes between census years have some drawbacks. They do not typically account for changes in the racial composition of a community, and they do not generally permit neighborhood-level analyses. Perhaps most importantly, even small errors in the accuracy of projections for neighborhoods or other population subgroups can result in large distortions in their rates.

To provide data on people of Latino ethnicity, who may be of any race, this report uses the 2000 US census for Boston census tracts, produced by the Bureau of the Census, and MISER and Massachusetts Department of Public Health population estimates, for denominators for rate calculations that require population data. This avoids the double-counting which would result if Latinos were included in the White, Black, and Asian racial categories as well as in the Latino categories.

## APPENDIX

### *Technical Notes*

#### **Population Estimates**

Interpolations of population counts were used in calculating birth rates for years between the 1990 and 2000 US censuses. The difference between the 1990 and 2000 US Census numbers by race/ethnicity were divided and applied across the time interval.

#### **Neighborhoods**

BPHC reports attempt to present data for geographic areas that are meaningful to readers, small enough to reveal variations in health patterns throughout the city, and large enough to be statistically reliable. The neighborhood definitions used in these reports were established in consultation with local residents, health care providers, and advocates throughout Boston and are used in all BPHC reports.

#### **Racial and Ethnic Designations**

National, state, and local health data sources usually make available data for only a few large racial and ethnic groups, and the classifications they use are not always consistent with other sources; caution should be used in comparing racial and ethnic data from different sources. The categories used in *Boston Natality 2005: A Review of 2003 Birth Data* are Asian, Black, Latino, Other, and White. These racial and ethnic designations are derived from the source of the data, including the US census, birth and death data from the Massachusetts Department of Public Health, and other sources.

The collection of race/ethnicity data varies with the data source. Some sources may rely on observation and others on self-reporting. Self-reporting is the preferable method. Race and ethnicity on death certificates are usually reported by the funeral director based on information provided by a relative or friend, while birth certificates usually collect information from the mother but may combine information reported by the mother, father, or other relatives.

In considering the racial or ethnic designations used in this report for Boston-specific data, several things should be kept in mind: (1) The concept of race has different meanings in different cultures. (2) Race is not a biological but a social phenomenon. (3) The meanings of racial designations are subject to historical, cultural, and political forces. (4) Finally, racial designations can be inaccurate in describing what they are called upon to describe. The term Black, for example, includes people who might describe themselves as African-American, African, Caribbean, or Haitian.



## APPENDIX

### Technical Notes

In the charts which present data by race and ethnicity or in the text which discusses health problems among racial and ethnic populations, it should be kept in mind that, as the CDC has said, "race and ethnicity are not risk factors [for disease]—they are markers used to better understand risk factors." Race is thus a proxy for such factors as socioeconomic status, inadequate access to health care, and racial discrimination. Information on race and ethnicity is included in this report because it can assist public health efforts to recognize disparities between groups for a variety of health outcomes.

Boston-specific data in this report are presented for each race/ethnicity group for which numbers are large enough to allow calculation of percentages or reliable rates.

Since people of Latino heritage may be of any race, the federal and state data sources often report data for Blacks and Whites, including Latinos in those categories. However, this report presents data for Latinas separately, with the data for the other groups (Asian, Black, Other, White) referring only to those who do not also consider themselves Latino.

### Prenatal Care Adequacy

Data about the initiation of prenatal care and the number of prenatal care visits received are assessed using the Adequacy of Prenatal Care Adequacy (APNCU) Index, developed by Milton Kotelchuck, MD, MPH. Also known as the Kotelchuck Index, this replaces the older Kessner Index and offers the capacity to distinguish between inadequacy of PNC due to late entry into care and inadequacy due to too-few visits.

APNCU Index Category	Month of Pregnancy in Which Prenatal Care (PNC) Was Begun	Percentage of Expected PNC Visits That Were Received
Adequate Intensive	1, 2, 3, or 4	110% or More
Adequate Basic	1, 2, 3, or 4	80% - 109%
Intermediate	1, 2, 3, or 4	50% - 79%
Inadequate	Month 5 or Later	Less Than 50%

NOTE: The expected number of visits uses the American College of Obstetricians and Gynecologists standard, which is based on the timing of PNC initiation and the length of gestation.

## APPENDIX

### *Glossary*

**Accidents and adverse effects:** Causes of death that include accidents such as motor-vehicle-related injuries. ICD-9 CM codes include E800.0-E940.9; ICD-10 codes include V01-X59, Y85-Y86. Homicides and suicides are excluded.

**Adolescent births:** Births to young women between 10 and 17 years of age.

**African American:** Persons self-identified as born in the US who have ancestors of African descent. Racial or ethnic designations from all sources used in this report except death certificates are self-reported.

**Age-specific birth rate:** The number of births per year in a given age group per 1,000 women in that age group.

**Asian:** Persons self-identified as Asian or Pacific Islander (e.g., Chinese, Japanese, Hawaiians, Cambodians, Vietnamese, Asian Indians, Filipinos) who do not identify themselves as Latino.

**Birth:** All births reported in this report are live births; spontaneous or elective abortions and stillbirths are not included.

**Birth rate:** The number of live births per year, per 1,000 persons

**Birthweight:** The weight of an infant at the time of delivery. It may be recorded in either grams or pounds/ounces. If recorded in pounds/ounces, it is converted to grams for use in this report based on the following formula: 1 pound = 453.6 grams; 1,000 grams = 2 pounds and 3 ounces.

**Black:** Persons self-identified as Black (e.g., African Americans, Haitians, West Indians) who do not identify themselves as Latino.

**Cesarean section:** The delivery of the fetus by an incision through the abdomen into the uterus. Often this procedure is done as a result of pregnancy-related complication such as the fetus being too large for the maternal pelvis. Breech presentations are also often handled by cesarean section.

**Confidence interval:** The range within which lies the true value of a variable, based on a chosen probability. For example, given the probability 95%, one can be ninety-five percent certain that the true value lies between numbers X and Y. The range between X and Y is the confidence interval.

## APPENDIX

### *Glossary*

**Embryo:** The product of conception from fertilization through the eighth week of development (approximately the tenth week of pregnancy), after which it is referred to as a fetus.

**Fetus:** The term used from the end of the eighth week after fertilization (end of the tenth week of pregnancy) to the moment of birth.

**Forceps:** An instrument used to grasp the fetal head as an aid in delivery; the delivery of an infant using such an instrument.

**Gestation:** The period of fetal growth in the uterus during pregnancy.

**Gestational age:** Length of pregnancy (in weeks) calculated as the number of weeks following the first day of the woman's last menstrual normal period. Pregnancy is approximately 40 weeks in length.

**Latino:** People of any race (Asian, Black, Other, or White) who consider themselves Hispanic or Latino, such as Puerto Rican, Mexican, Cuban, Spanish, and Dominican.

**Homicide:** A death intentionally caused by a person other than the deceased. ICD-9CM codes E960.0-E969.9; ICD-10 codes X85-Y09, Y87.1.

**Infant mortality rate (IMR):** The number of deaths per 1,000 live births among infants less than one year old.

**Kotelchuck Index:** A measure of the adequacy of prenatal care utilization. Formally known as the Adequacy of Prenatal Care Utilization Index. See **Prenatal care** in the Technical Notes section of this report.

**LBW:** Low birthweight. Weight of an infant at delivery of less than 2,500 grams (5.5 pounds).

**Live birth:** Any infant who breathes or shows any other evidence of life (such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles) after separation from the mother's uterus, regardless of the duration of gestation.

**Logistic regression:** A statistical technique used to identify associations between independent variables, such as race or sex, and a selected dependent variable, such as preterm birth.

**Low birthweight (LBW):** Weight of an infant at delivery of less than 2,500 grams (5.5 pounds).



## APPENDIX

### *Glossary*

**Miscarriage:** Spontaneous abortion. The spontaneous expulsion of embryo or fetus before 20 completed weeks' gestation.

**Morbidity:** Illness, disease, or injury.

**Mortality:** The frequency of deaths in a specific time period; death rate.

**Multiple births:** The birth of two or more offspring from the same pregnancy.

**Neonatal death:** Death of an infant between live birth and 27 days of age.

**Neonatal mortality rate:** The number of neonatal deaths per 1,000 live births.

**Odds ratio:** A number that represents the likelihood of one group having an existing characteristic or an event occur in comparison to another group. An odds ratio of 4, for example, means that a particular group (for example, persons who smoke) is four times as likely to experience a certain condition (for example, cancer) as a group with which it is compared (persons who don't smoke).

**Other race:** People self-identified as a race other than Asian, Black, or White (for example, American Indian/Native American, Aleut, Eskimo) and not Latino.

**Parity:** The number of live births a woman has had.

**Perinatal:** Occurring during or pertaining to the period before, during, and after birth. Usually refers to the 28th week of gestation through the first seven days following delivery.

**Perinatal conditions:** Conditions originating in the perinatal period. Examples of such conditions include: birth trauma, disorders related to short gestation and low birthweight, disorders related to long gestation and high birthweight, respiratory and cardiovascular disorders or infections specific to the perinatal period. ICD-10 codes P00-P96.

**Plurality:** The number of births from the same pregnancy; a singleton (1), twins (2) triplets (3), quadruplets (4), quintuplets (5), sextuplets (6).

**Postneonatal death:** Death at 28 through 364 days of age.

## APPENDIX

### *Glossary*

**Postneonatal mortality rate:** The number of postneonatal deaths per 1,000 live births.

**Pregnancy:** The condition of carrying a developing embryo or fetus in the uterus.

**Prenatal care (PNC):** Medical and related services provided during pregnancy to improve the likelihood of a healthy pregnancy, safe delivery, and healthy full-term infant.

**Preterm birth:** Birth before 37 completed weeks' gestation.

**Private insurance:** Health insurance not paid for by public funds. Types of private insurance include health maintenance organizations (HMOs), Blue Cross/Blue Shield, and commercial insurers.

**Public insurance:** Health insurance paid for by public funds. This includes Medicaid, the state Healthy Start program, other types of governmental programs, and the Uncompensated Care Fund (the Free Care Pool).

**Race, other:** See Other Race

**SIDS:** See Sudden Infant Death Syndrome.

**Singleton:** A pregnancy consisting of a single infant, or such an infant.

**Socioeconomics:** Social and economic characteristics of a population, such as education and poverty levels.

**Sudden Infant Death Syndrome (SIDS):** The unexpected and unexplained death of an apparently well infant, often occurring during sleep. SIDS is the most common cause of infant death between the second week and the end of the first year of life and occurs most frequently in the third and fourth months of life, in premature infants, in males, and in African-American infants. ICD-9-CM code 798.0; ICD-10 code R95.

**Term:** Birth at a gestational age of 37 or more completed weeks.



## APPENDIX

### Glossary

**Trimester:** A period of three months.

First trimester: The first three months of pregnancy.

Second trimester: The middle three months of pregnancy (four to six months).

Third trimester: The final three months of pregnancy (seven to nine months).

**Triplet:** One of three infants from the same pregnancy.

**Twin:** One of two infants from the same pregnancy.

**Vacuum extraction:** The delivery of an infant by the use of an instrument designed to apply suction to the head of the fetus.

**Vaginal birth:** The delivery of an infant through the birth canal.

**Very Low Birthweight (VLBW):** Weight of an infant at time of delivery of less than 1,500 grams (3.3 pounds).

**Weight gain:** The total weight in pounds that a woman gains during her pregnancy. The current general guidelines recommend that a woman of normal weight and average height gain no less than 15 pounds and no more than 40 pounds.

**White:** Persons self-identified as White who do not identify themselves as Latino.







